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THE ANATOMY

AND

SURGICAL TREATMENT

OF

ABDOMINAL HERNIA.

IN TWO PARTS.

By SIR ASTLEY COOPER, BART., F.R.S.

SURGEON TO THE KING, AND CONSULTING SURGEON TO GUY'S HOSPITAL.

SECOND EDITION.

By C. ASTON KEY,

SENIOR SURGEON TO GUY'S HOSPITAL, AND LECTURER ON SURGERY.

LONDON:

PUBLISHED BY MESSRS. LONGMAN, REES, ORME, BROWN, AND GREEN, PATERNOSTER ROW.

1827.

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TO THE
THE ANATOMY

KING'S MOST EXCELLENT MAJESTY

SURGICAL TREATMENT

IN RESPECT FOR HIS EXCELLED STATION

OF

IN VENERATION OF THE REVERENCE OF HIS DISPOSITION

ABDOMINAL HERNIA.

IN ADMIRATION OF HIS TALENTS

IN TWO PARTS

AND IN GRATITUDE FOR NUMEROUS ACTS OF KINDNESS

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ASTLEY COOPER.

LONDON; DECEMBER 1, 1827.

DEDICATION OF PART I. OF THE FIRST EDITION.

PREFACE.

TO

HENRY CLINE, ESQ.,

LECTURER ON ANATOMY AND SURGERY,

AND

SURGEON TO ST. THOMAS'S HOSPITAL.

MY DEAR SIR,

Two reasons strongly impel me to dedicate the following Work to you. The one is, that many of the ideas which it contains have been derived from your public and private instructions:

The other, that it gives me an opportunity of acknowledging, with gratitude, the kind attention which I invariably experienced from you whilst an inmate of your family.

That you may long continue to enjoy an exalted professional reputation, acquired solely by merit, and unsullied by a single unworthy act, is the ardent wish of,

Your sincere friend,

And colleague,

LONDON, JAN. 10, 1804.

ASTLEY COOPER.

P R E F A C E.

IN the following pages I have endeavoured to describe the anatomy and surgical treatment of Abdominal Herniæ.

No disease of the human body, belonging to the province of the surgeon, requires in its treatment a greater combination of accurate anatomical knowledge with surgical skill, than Hernia in all its varieties. Symptoms, immediately threatening the extinction of life, occur at times, and in situations, that afford but little opportunity for consulting the authority of others; and demand in the surgeon a prompt resolution and decisive practice. Accurate anatomical knowledge is frequently required to detect the presence of this disease at that period at which alone the milder process of reduction is practicable; and still more is the combination of skill and intelligence necessary to enable the surgeon to meet all the occurrences which may happen, when the use of the knife becomes the only method of saving the patient.

It has therefore been a primary object with me to trace the progress of the disease from its commencement, to explain the nature and uses of the parts contiguous to Hernia, which are in any way connected with its formation and increase; and especially to describe, with sufficient minuteness, the surrounding arteries, as far as their course interferes with the operations of the surgeon.

Another object of this Work is, to lay down rules for operating, calculated to meet all the varieties of Hernia hitherto discovered. These varieties are in their nature sufficiently complicated; but it is the business of the surgical teacher to simplify the practice as much as possible, prescribing general rules, of easy application, to embrace the majority of cases that are likely to occur, and distinguishing how far the anomalies of the disease are to furnish exceptions to the accustomed modes of practice. Thus prepared, the operation itself being on the whole easy, and attended with but little danger to the patient, the surgeon will undertake it with that decisive confidence which is the fruit and reward of the pains employed to acquire a clear insight into the several steps to be pursued.

The mode of operating for Inguinal Hernia here proposed, has been taught by me since the year 1792, when I first began to give public lectures on surgery; and since that time having had several opportunities of putting it in practice myself, and of seeing it adopted by others, I can recommend it with confidence as being both safe and effectual.

Something remains to be said as to the execution of the Work. Much confusion is often created in anatomical description, by a want of uniformity in the use of terms employed to express the relative situation of parts. I have therefore endeavoured, in some degree, to supply the defect, (though imperfectly) by limiting the use of certain terms expressive of relative situation, in those cases where doubts could arise in the mind of the reader from any variety of meaning usually attached to these appellations. I am aware that in the course of an entire work, it is scarcely possible always to preserve consistency of nomenclature, where the terms are in common use, and are perpetually occurring to the mind in a sense different to that to which they have been thus artificially restricted. I hope, however, that it will be found sufficiently correct, in that part of the anatomical description, where the relative situations of organs, with their mutual bearings, have been described. Here, I have restricted the terms *above*, *below*—*top*, *bottom*—*up*, *down*—*superior*, *inferior*—*ascending*, *descending*, to imply the

direction from head to foot: the terms *before, behind—over, under—forwards, backwards—anterior, posterior*, to a direction from the surface of the abdomen and fore part of the body, to the viscera and deeper-seated parts: and the terms *inner, outer—within, without—internal, external*, imply situation nearer to, or further from, a line (perpendicular when the body is erect) drawn through the chin, navel, and pubis.

I have almost uniformly, in the following Work, avoided quoting the opinions of authors on this part of surgery. This I have done, certainly not from any wish to slight or undervalue the labours of some of the most excellent physiologists and practitioners that have adorned our profession, but because it did not form a part of my plan to give a history of this branch of surgery, and because I wished to confine myself to the very wide scene of observation afforded by the two noble institutions of Saint Thomas's and Guy's Hospitals, and to that portion of the practice of this metropolis, which I have been personally enabled to authenticate. I have therefore related no case, and given no remark, to the truth of which I cannot vouch.

The plates have been executed by Mr. Heath, from drawings of Mr. Kirtland: of their excellence, in point of art, my readers must judge, but I may add, that to insure their accuracy as faithful copies of the original preparations, all the outlines have been laid down from an exact measurement of parts.

The first part of the former edition of this Work was published in the year 1804, since which time the subject of Hernia has been further elucidated in the works of Hesselbach, of Lawrence, and of Scarpa, of whom it is scarcely possible to speak in language adequate to their merits.

It has given me pleasure to find that these anatomists, and many late anatomical writers, agree with my description of the fascia transversalis, the upper abdominal aperture, and in the covering which the Femoral Hernia receives from the sheath of the femoral vessels, and which I have named the fascia propria.

It is also, I believe, generally agreed by surgeons, that to avoid the danger of wounding the epigastric artery, it is better to divide the stricture in Hernia at the middle and anterior part of the hernial sac upwards, than to vary the operation from a belief in the possibility of knowing the course of that artery at the moment, as this avoids the danger which attends the division outwards in one Hernia, and inwards in another: and I may here observe that even in Femoral Hernia, although the division of the stricture in the direction towards the umbilicus is the most proper, that directly upwards is perfectly safe, made slightly with the knife and extended by the finger or director, which I consider as the safest plan.

The subjects of the plates were principally taken from the dead body by myself; but some few were made from preparations previously in the collection at Saint Thomas's Hospital. Those taken from Saint Thomas's Hospital are—

In Part I.—Plate V., Fig. 1, 3, 4, 7, and 8. Plate IX. Plate XI., Fig. 3, dissected by Dr. Haighton.

In Part II.—Plate X., Fig. 1, and 2. Plate XIV., Fig. 2.

ASTLEY COOPER.

EDITOR'S PREFACE.

THE high character which the first edition of this Work has long held in the estimation of practical surgeons, and the importance of the subject of Hernia, are the motives which have induced me, with the Author's permission, to offer a second edition to the surgical profession.

In the performance of his duty an editor has, I conceive, the following objects to fulfil:—First, to form a due conception of his author's views, in the pathology and treatment of the disease under consideration. Secondly, to establish his author's claim to originality in such points as may be justly considered peculiar to him. Thirdly, to compare his opinions and practice with those of his contemporaries; and, fourthly, to add such observations as his own experience and opportunities may have suggested.

That these objects are attained in the present edition, I will not venture to presume. As regards the two first; a long acquaintance with the Author's professional opinions generally, has enabled me to render myself more particularly conversant with his sentiments on the subject of Hernia, and thus to make such a selection from his papers and cases as should best serve to illustrate the subject, and to set in a more prominent light the contributions which he has himself made to this department of science. The two latter points require comment, in order, on the one hand, to avert undue criticism from what may appear an attempt to enhance the value of the Work by the addition of notes; and, on the other, to account for the comparatively few extracts from other works which I have thought fit to insert. This too frequent custom I have purposely deviated from; not from any wish to shrink from this important part of an editor's duty, but from a desire to avoid a fault common to many surgical writers—that of extracting cases which are already before the public in print, and thus enlarging unnecessarily the catalogue of medical literature. I have therefore limited my extracts to such as appeared to me to be apposite or necessary in the illustration of an important principle, endeavouring at the same time to preserve utility in the execution of my task, and to retain that character for originality which this Work is universally allowed to possess.

I have to return my thanks to Mr. Hingeston, to whom I am indebted for the drawing from which the engraving of Direct Hernia is made. The sketch of M. Dupuytren's forceps for artificial anus was copied from a journal; it gives a correct representation of the instrument with the exception of the handles being of unequal length, which the drawing does not shew. M. Dupuytren has had the politeness to send me the instrument, which I regret not having received in time to have given a more exact representation.

ERRATA.

Part I.—Page 28, note, for *ilium*, read *ileum*.

———— for *valvala*, read *valvula*.

———— Page 82, note, for *two to fifteen*, read *fifteen of the former to two of the latter*.

By an original error of the Engraver, *Plate III. Part II.*, is numbered *Plate II. Part I.* and *Plate IV. Part II.*, is numbered *Plate III. Part II.*—In *placing* the plates these errors are corrected.



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ANATOMY

AND

SURGICAL TREATMENT

OF

HERNIA.

PART I.

OF INGUINAL HERNIA.

CHAPTER I.

General Description of Hernia.

A PROTRUSION of any viscus from its proper cavity is denominated a hernia. The protruded parts are generally contained in a bag, formed by the membrane with which the cavity is naturally lined. Definition.

Several parts of the body afford examples of this disease. A deficiency in the bones of the head will sometimes allow the protrusion of part of the brain and its membranes, from the inner to the outer side of the skull, forming a hernia of this organ. Encephalic hernia.

An imperfect state of the intercostal muscles may permit part of the lung, with its pleura, to form an external tumour, or hernia of the contents of the chest. Thoracic.

But the disease most frequently occurs about the cavity of the abdomen; and on this account, as well as from its superior importance in a surgical point of view, I shall confine my observations to this species, with its several varieties. Abdominal.

Many reasons may be assigned for the very frequent occurrence of protrusions from the abdomen. Causes of its frequent occurrence.

First: The viscera of this cavity are numerous, some of them very moveable, and others loosely connected by peritoneal attachments with the surrounding parts; and they are constantly exposed to changes of size and relative situation, from sudden or gradual distention.

Secondly: The parietes of the abdomen are composed of muscles, which, when in action, contract the dimensions of this cavity, compress the bowels, and thus have a tendency to force them from their natural situation.

Thirdly: For the passage of vessels and nerves, these muscles and their tendons have various apertures, which, though naturally only large enough for that purpose, often become so much relaxed as to allow the viscera themselves to protrude.

Lastly: The muscles are sometimes imperfectly formed, and the viscera escape through unnatural apertures.

The following are the situations in which abdominal herniæ are found: Situations of the abdominal.

First: It appears at the abdominal rings, generally passing in the same course with the spermatic cords in the male, and the round ligaments of the uterus in the female; thence it is continued down into the scrotum in the one sex, and the labium pudendi in the other. This hernia of the abdominal ring is known to surgeons under the various appellations of inguinal hernia, bubonocoele, scrotal hernia, and oscheocoele. Inguinal.

Secondly: A hernia also penetrates under Poupart's ligament, forming a tumour at the inner and upper part of the thigh. In this situation it is called femoral hernia, crural hernia, or merocele. Crural.

Thirdly: Another species is formed at the navel by a protrusion through the opening which was formed in the fœtus for the passage of the umbilical cord. This has received the name of umbilical hernia, or exomphalos. Umbilical.

Fourthly: Similar protrusions take place through the tendinous covering of the anterior part of the abdomen. The linea alba and semilunaris are perforated to transmit vessels passing to the common integuments: when these holes are either originally of an unusual size, or are enlarged during a relaxed state of body, herniæ will occasionally be formed in them, which are then called ventral. Ventral.

Thyroideal.	Fifthly: Another part, at which hernia sometimes appears, is the foramen ovale of the pelvis; it then takes the name of the aperture, and is termed hernia foraminis ovalis, obturatoria, or hernia thyroidea.
Ischiatic.	Sixthly: Sometimes, though rarely, a hernia is produced at the ischiatic notch projecting by the side of the sciatic nerve under the glutæi muscles. This takes the name of the part, and is termed hernia of the ischiatic notch, or ischiatocele.
Perineal.	Seventhly: Sometimes a hernia passes between the bladder and rectum in the male, and between the rectum and uterus in the female, appearing in the perineum. It is then called hernia perinei.
Vaginal.	Eighthly: I have seen the vagina protruded by a descent of the viscera between the rectum and uterus, and pushed backwards by the bladder, forming a considerable external tumour when the bladder was full, which disappeared as soon as it was emptied.
Pudendal.	Ninthly: I have met with a hernia protruding into the labium pudendi, passing under the ramus of the ischium with the internal pudendal artery, but continued into the pelvis by the side of the vagina.
Diaphragmatic.	Tenthly: Hernia has been known to protrude through the diaphragm, sometimes by the side of the œsophagus, sometimes accompanying the vena cava inferior, sometimes, though more rarely, by the side of the aorta, but more frequently through unnatural apertures in the muscle.
Mesenteric.	Eleventhly: I have two preparations in my possession, of hernia occasioned by the viscera passing between the laminae of the peritoneum; in one of these they passed into the mesentery;
Mesocolic.	Twelfthly: In the other into a bag formed by a separation of the laminae of the mesocolon, in which all the small intestines were contained. When the mesentery is imperfectly formed, openings are sometimes found in it, through which the viscera pass and become strangulated; these can scarcely be termed herniæ, as the intestine still remains within its proper abdominal cavity.
Congenital.	That species of hernia, which, from its frequently appearing at the time of birth, is called congenita, takes the same course through the abdominal rings as the inguinal hernia; but instead of passing down upon the fore part of the spermatic process, it descends within the tunica vaginalis testis, and ought therefore to be named the hernia tunicae vaginalis.
The most frequent.	There is no part of the abdomen, excepting where the parietes are formed of bone, at which hernia may not occur; for, when the formation of the muscles is defective, it may happen even at the loins, in which case the kidney has been known to be part of the protruding substance. But of all the varieties of this disease which I have enumerated, the inguinal, femoral, and umbilical herniæ most frequently occur.
Sex.	The difference in the structure and œconomy of some parts of the abdominal parietes in the two sexes, renders the one sex disposed to that kind of hernia, from which the other is comparatively exempt; thus the large size of the inguinal canal in men, causes inguinal hernia to be a very common disease among them; whilst among females, it is but rarely met with; and on the contrary, the proportions of the female pelvis and distention of the abdomen from pregnancy, together with other circumstances, dispose this sex to be the frequent subjects of crural and umbilical herniæ, which may be regarded as uncommon diseases in man.
Named from contents.	The names that have been given to different kinds of hernia, have been derived from their contents, as well as their situations. If they contain only omentum, they are called omental hernia, or epiplocele; if only intestine, intestinal hernia, or enterocoele; if both omentum and intestine, entero-epiplocele; if the stomach is contained in the tumour, gasterocoele; if the liver, hepatocoele; if the bladder, cystocoele, or hernia cystica; if the uterus, hysterocoele; and the same of others; for, excepting the duodenum and the pancreas, which are too closely connected with the spine easily to change their situation, all the different abdominal viscera have occasionally been found to form the contents of a hernial tumour.
Viscera most frequently found in them.	However, the viscera usually met with in hernia are the omentum, and the ileum; the next in frequency is the colon, then the cæcum, and lastly the jejunum; sometimes the appendix cæci is the only part of the intestine found in the hernial sac.
Hernial sac.	The cavity of the abdomen is every where lined by peritoneum, which in hernia generally protrudes prior to the descent of any viscus, and thus a bag or sac is formed by this membrane, in which the protruded viscera are afterwards contained. To this there are occasional exceptions, arising from some of the viscera being only partially covered by peritoneum in their natural state.
Its formation.	The older surgeons thought that herniæ were formed by a laceration of the peritoneum and abdominal muscles, which gave rise to the term <i>rupture</i> ; but dissection has proved that such a rupture of the membrane scarcely ever happens. The peritoneum in forming a hernial sac is not dragged from its natural situation, but becomes elongated by gradual distention, and it is usually not only lengthened, but slightly thickened; for a long continued pressure of moderate force will produce an elongation and thickening of fibre, though a greater

degree will bring about an entire absorption of parts. This is proved, in the first case, by the vast increase of size and thickness which the tunica vaginalis undergoes in an old hydrocele; and in the second, by the entire removal of the sternum and cartilages of the ribs in aneurism. It is by the first of these principles in the animal œconomy that a hernial sac is produced, and if the sac be compared with the peritoneum from which it originated, it will generally be found to be a more dense and compact membrane. But when the hernia becomes of very considerable magnitude, the peritoneum forming the sac becomes thinner than natural; for the extension may go beyond the degree at which pressure thickens; and from this cause it is that in old and large herniæ, the peristaltic motion of the intestines may sometimes be seen through the sides of the sac. This is also one reason why herniæ are sometimes found without sacs, for, the process of extension having ceased, the sac becomes either entirely absorbed or remains only at the orifice; and hence, over the larger part of the tumour in one species of hernia, frequently no covering is left for the protruded viscera but skin and cellular membrane.

Sometimes thinner than the peritoneum.

On the other hand, the sac has occasionally been observed to be so much thickened as to retain nothing of its original peritoneal texture, and to be divisible into layers. But from what I have seen of this disease, I am induced to believe that this opinion has originated from the want of sufficient distinction between the coverings of the sac, and the sac itself; for, as far as I can discover from dissection, it is the former which are extremely thickened in old hernia, whilst the latter is but little denser than the peritoneum.

Thickened.

A hernial sac, however small, adheres to the parts by which it is surrounded, but yet can be readily drawn into the cavity of the abdomen; this I have several times done in the dead subject, and have then seen the sac lying loosely within the cavity of the abdomen, at the orifice through which it had descended. The return, however, of the sac can only be effected whilst the hernia is small, and in the most recent state; for, if it has been of long standing, or has descended far, it has always contracted such firm adhesions to the surrounding parts, that it can be separated only by dissection. At first the adhesions are few and weak, but they gradually become strong, and uniformly spread over the surface of the sac.

Adhesion.

The opening by which the sac communicates with the abdomen is generally its smallest part, and is called its mouth; but when it has passed a short way from the abdomen, and has quitted the tendons which surround its mouth, it enters parts more easily distensible than tendinous structure, and then dilates into a bag of a pyriform shape.

Shape.

As the hernial sac generally passes through openings which are designed for the passage of blood-vessels, its exact situation with respect to these vessels should be attended to most carefully. Nor are those which accompany the hernial tumour the only vessels that require attentive observation; for in the two most important herniæ, the inguinal and femoral, an artery passes near the orifice of the sac, the course of which it is of the utmost importance for the surgeon to observe, as an ignorance of it must often expose the life of the patient to imminent risk in the operation for hernia when in a state of strangulation, as two cases hereafter detailed will shew.

Vessels connected with it.

The coverings with which a hernial tumour is invested, will entirely depend on the nature and structure of the parts protruded before the sac; thus, in one kind of inguinal hernia, muscular fibre is found to be a covering; in another species, the dense tendon of a muscle is the envelope; while in a third variety, we find both these coverings combined.

Coverings.

Several hernial sacs are sometimes found in the same subject at different parts; an instance of this is subjoined, that occasioned a difficulty in determining which was to be the subject of operation. Sometimes more than one hernia exists in the same situation. I have a preparation of two hernial sacs at each groin, with another in an incipient state on the left side; and the subject of one of the plates in this part of the work, represents two herniæ on one side and one on the other. When this is the case, they seldom are all at the same time in a state of protrusion, and the second sac is often formed after the cure of the first, two examples of which will be hereafter related.

Several sacs.

A hernial sac is sometimes burst by a blow. When this happens, its contents escape out of the sac, and become placed under the contiguous skin, so that the viscera require to be returned into the sac before they can pass into the abdomen. I attended a case of inguinal hernia under these circumstances, with Mr. Brickenden, a surgeon in Southwark: the viscera had escaped under the skin of the scrotum, through a hole in the fore part of the sac, and were obliged to be returned into the sac before the reduction of the hernia could be effected.

Burst.

The protruded parts are not always, however, contained in a sac; for, when hernia arises from a mal-formation of the muscles, attended with unnatural apertures in them, these holes are not always covered by peritoneum. This was the case in a hernia protruding through the diaphragm which I met with some years ago; the colon, the viscus that had escaped into the chest, was lying upon the lung without any peritoneal sac. This exception, however, does not universally hold in the diaphragmatic herniæ, for I have known one instance in which the viscera

No sac.

were included in a process of peritoneum. The hernia congenita has not a peritoneal covering distinct from the tunica vaginalis testis, except in a very uncommon variety of the disease. The hernia cystica is described as being equally destitute of this membranous coat; but this is only true in the commencement of the disease.

Dr. Marshall has a preparation of umbilical hernia in which no sac appears, but the protruded parts lie in direct contact with the skin. This variety is very rare; but the possibility of such an occurrence should be known, as in performing the operation for hernia extreme care should on this account be taken, to avoid wounding any of the protruded viscera.

CHAPTER II.

*Anatomy of the Parts concerned in Inguinal and Femoral Hernia.**

FIVE pairs of muscles with their tendons form the principal covering of the abdomen. These are, on each side, the obliquus externus, the obliquus internus, the transversalis, the rectus, and the pyramidalis. The three first of these only, however, are concerned in the production and course of the two kinds of herniæ in question.

External oblique.

The external oblique muscles, arising from the eight inferior ribs on each side, slope with an easy descent towards the lower part of the abdomen, and end in an expanded tendon, which covers the whole of the hypogastric and part of the umbilical regions.

This tendinous expansion is provided in man to defend him from the accidents to which his erect attitude would naturally subject him. In quadrupeds, to whom the horizontal position is natural, the weight and pressure of the viscera are diffused over the whole of the abdominal parietes; but in the human subject, when the abdominal muscles and diaphragm are combining their powerful efforts to fix the ribs, to enable the muscles of the upper extremity to act to the greatest advantage, the viscera being forced towards the lower part of the belly, muscular fibre would prove but a feeble barrier, and herniæ would probably be the invariable consequence of muscular exertion. This tendon rarely allows an intestine to escape between its fibres; strengthened by an interlacement of texture, it supports the weight of pregnancy and of dropsical accumulations, resists the pressure arising from excessive obesity and from muscular contraction, and would altogether have exempted man from the occurrence of inguinal rupture, were it not for the existence of two openings in it about to be described.

Abdominal ring.

In the lower part of the tendon of each muscle, a little above and to the outer side of the symphysis pubis, is an opening called the abdominal ring, formed for the passage of the spermatic cord to the testicle in the male, and the round ligament of the uterus in the female. The following is the mode in which these openings are produced.

The tendon of the external oblique, as it proceeds towards the pubes, splits into two columns, leaving a space for the passage of the spermatic cord: the upper broad column is attached to the symphysis pubis, and crosses its fellow on the opposite side; the lower rounded column, after being doubled under the spermatic cord, is fixed to the process of the pubes, called its spinous process, which may be felt in the living subject; from the under edge of this column, a process of tendon is sent obliquely backwards to the crest of the pubes. Thus it appears that the lower part of the tendon of each muscle has three insertions into the os pubis. First, into the symphysis, by means of the upper column of the ring: secondly, into the spinous process, by the inferior column: and, thirdly, into the crista, or linea ilio-pectinea, by means of a process of tendon called Gimbernat's ligament. *Vide Plate I. and II.*

These columns are united, at the point where they begin to diverge, by cross tendinous fibres, which may be traced from the anterior superior spinous process of the ilium, and from the lower boundary of the tendon called Poupart's ligament. These fibres cross from one pillar to the other, and bind them firmly together, assisted by

* In the former edition of this work the anatomy of these parts was given separately, the former being described in the first, the latter in the second part. This arrangement was consistent with the plan of the original edition, as the two parts were not given to the public together; but as the same structures are concerned in the production of both kinds of hernia, a division of the subject destroys the natural connexion, and renders the description less intelligible. I have, therefore, by permission of the Author, united the anatomical descriptions, and given them both in the first part of the work.—ED.

additional bands passing between the edges of the columns. The direction of these fibres is at right angles with those of the tendon of the external oblique.

The direction of the abdominal rings is obliquely upward and outward; for, although they have received the appellation of rings, they are far from being annular in their figure, but approach rather to the triangular form; their longest diameter, which is that from the pubes to the transverse fibres, is about an inch; while their transverse breadth from one column to the other is only half an inch: the centre of the aperture is one inch and a quarter from the symphysis pubis.

A dense cellular fascia is found under the integuments, covering the tendon of the external oblique muscle; it adheres to the edge of the abdominal ring, and accompanies the spermatic cord* in its descent into the scrotum, with which latter it is closely connected; it also descends upon the thigh; and, to distinguish it from other structures, I shall call it superficial fascia. It gives a covering to both inguinal and femoral herniæ.

The direct passage of the spermatic cord into the cavity of the abdomen is prevented by tendons and a fascia, which are probably intended as a guard against protrusion of the contents of the belly. The tendons that close the opening, are those of the internal oblique and transversalis muscles.†

Behind the tendon of the external oblique, the lower fibres of the obliquus internus take their course; those from the spine of the ilium horizontally towards the linea semilunaris and alba, while those which arise from the outer half of Poupart's ligament are passing obliquely towards the pubes. The lower fibres, after passing over the spermatic cord, terminate in a tendon, which is inserted into the symphysis pubis. If the finger be passed through the ring, this tendon may be felt immediately above it, and towards its inner side.

The lower portion of the transversalis runs nearly parallel to the former, but arises only from one third of Poupart's ligament; passing underneath, and concealed by the internal oblique, the fibres also cross the spermatic cord, and end in a tendon, which is connected with that of the latter muscle, and is inserted into the linea alba and pubes. But the tendon of the transversalis descends much lower than that of the internal oblique; and towards the pubes and Gimbernat's ligament, forms a semilunar expansion, which is connected with a fascia presently to be described;‡ it is more particularly by the union of these that the abdominal ring is closed behind. See Plate II. Part 2nd.

The foregoing description will shew that there is no natural aperture into the abdomen behind the ring; and therefore the opening, by which the spermatic vessels quit the abdomen, must be sought for elsewhere. It will be found one inch and a half above, and to the outer side of the abdominal ring, in a line passing from the ring to the superior spinous process of the ilium. This line marks the course of the spermatic cord; and the opening, which allows its immediate exit from the abdomen, is formed in a fascia, to understand the nature of which, Poupart's ligament and its fasciæ must be more particularly described.

Poupart's ligament, or, as it is now commonly called, the crural arch, is a rounded band of tendon connected to the superior spinous process of the ilium, whence it passes down in a vaulted form over the femoral vessels, and terminates at the pubes on the inner side of these vessels in a semicircular sweep, from whence proceeds a triangular portion connected with the spine of the pubes and continued inwards to the crista of the bone. Its insertion is best seen, as well as the parts hereafter described, by dissecting them as in plate first. If there had

* In the dissection of the superficial fascia, it will be found to have but a very slight connexion with the spermatic cord; from which it may be readily separated by passing the finger between them. When the fascia is raised, a layer of fine polished reticular membrane is seen covering the cremaster muscle, and reaching as low as the testicle, which serves as it were to insulate the cord from the surrounding parts, and thus to facilitate its motion; it is between this fine tela and the superficial fascia, that air readily finds a passage, when thrown in at the external ring. This delicate membrane prevents any communication between the vessels of the cord and scrotum, except at the lower part of the testicle, where the remains of the gubernaculum render the connexion between the testis and scrotum more firm.—Ed.

† To shew the idea which was generally entertained respecting the structure behind the abdominal ring, I shall quote a passage from Richter, also quoted by Mr. Lawrence. —“Derrière cette fente uniquement remplie par du tissu cellulaire et par les parties mentionnées, est placé le péritoine, qui n'est recouvert par aucun muscle, et qui doit non seulement résister à la force distendante, mais encore au poids des viscères de l'abdomen.”—Ed.

‡ The descent of the tendon of the transversalis muscle upon the fascia transversalis is not noticed by the latest authors on this subject, which is the more surprising on two accounts,—first, as without such a defence to the ring, the occurrence of direct hernia would be very frequent, for the fascia transversalis alone would hardly be capable of resisting the pressure of the viscera; secondly, the stricture of an oblique inguinal sac is not unfrequently caused by the curvature of this tendon. The union of the tendon of the muscle, with the fascia transversalis, not only strengthens the latter by an addition of fibres, but by the action of the muscle the fascia is rendered tense behind the external abdominal ring.—Plate II. Fig. 5. Part 2nd.

Winslow mentions the insertion of the tendon into the pubes, which alone would be insufficient to prevent an intestine protruding the fascia transversalis directly through the ring.—Winslow's Anatomy. p. 169.

Mr. Lawrence says, “The lower margin of these two muscles (the obliquus internus and transversus), which arise from the upper half of Poupart's ligament, is found behind and within the outer pillar of the abdominal ring, and is fixed into the pubes behind the ring.”—Treatise on Ruptures. p. 160. 3rd. Ed.

Scarpa describes it as follows: “L'Aponeurosi del trasverso surmonta il muscolo retto per inserirsi nella linea bianca, et piu in basso che l'anello inguinale si pianta nel pube, dietro l' inserzione dell' aponeurosi dell' obliquo interno.”—Sull' Ernie Memorie. p. 5. Ediz. Sec.

Cloquet, in his description of the transversalis muscle, makes no mention of this attachment of the tendon.—Recherches Anatomiques sur les Hernies. p. 22.—Ed.

been no other defence to the lower part of the abdomen, than what is afforded by this arch, few persons would be exempt from herniæ; but this part is fortified by other means.

Three distinct fasciæ are connected with the crural arch, two of which pass upward to assist in supporting the abdominal viscera; and one descends upon the muscles of the lower extremity, known as the fascia lata femoris. One of these only will at present be considered.

Fascia transversalis.

Internal abdominal ring.

When the lower portions of the internal oblique and transversalis muscles are raised from their subjacent attachments, a layer of fascia is found to be interposed between them and the peritoneum, through which the spermatic vessels emerge from the abdomen. This fascia, which I have ventured to name *fascia transversalis*,* varies in density, being strong and unyielding towards the ilium, but weak and more cellular towards the pubes. Midway between the spine of the ilium and pubes, the opening will be seen, which is now generally known as the internal abdominal ring; the edges of it are indistinct on account of its cellular connexions with the cord; when these are separated, the fascia in which it is formed will be found to consist of two portions; the outer strong layer, connected to Poupart's ligament, winds in a semilunar form around the outer side of the cord, and bounds the aperture by a distinct margin, from which a thin process may be traced passing down upon the cord. The inner portion, which is found behind the cord, is attached to, but less strongly connected with the inner half of the crural arch, and may be readily separated from it by passing the handle of a knife between it and the arch. It ascends behind the tendon of the transversalis, with which it is intimately blended, passes around the inner side of the cord, and joins with the outer portion of the fascia above the cord, being at length firmly fixed in the pubes; the inner margin of the ring is less defined than the outer, the fascia transversalis being doubled inwards towards the peritoneum, to which it is firmly attached. Thus, then, it appears, that the *internal ring* is not a circumscribed aperture like the external abdominal ring, but is formed by the separation of two portions of fasciæ, which have different attachments and distributions at the crural arch; the outer portion terminating in Poupart's ligament, while the inner portion will be found to descend behind it, to form the anterior part of the sheath that envelopes the femoral vessels. The strength of this fascia varies in different subjects; but in all cases of inguinal hernia it acquires considerable strength and thickness, especially at its inner edge; and if these parts had been formed without such a provision, the bowels would, in the erect posture, be always capable of passing under the edge of the transversalis muscle, and no person would be free from inguinal hernia. *Vide Plate.*

The fascia transversalis† may be traced as high as the diaphragm; and on the inner side it passes behind the rectus muscle, where it begins to assume the character of cellular tissue.

Spermatic cord.

Through the two openings which I have described, the spermatic cord passes down to the testicle. The cord is composed of arteries, veins, nerves, absorbents, an excretory duct called the vas deferens, a membranous sheath, and the cremaster muscle.

*I discovered this structure in the following manner: Having frequently heard Mr. Cline describe the oblique course of the spermatic cord on the outer side of the epigastric artery, I was led to examine into the cause of this obliquity, and to ascertain what parts closed the external abdominal ring. I found the tendon of the internal oblique attached to the pubes behind the ring, and, contrary to the description of Innes, the transversalis tendon also inserted into the pubes. Raising the internal oblique and transversalis muscles to examine the peritoneum, I was surprised to find a structure between them and the peritoneum, and an opening in it giving passage to the spermatic cord, which adhered to the edge of the aperture by a thin membrane.—A. C.

Hesselbach, who published on the subject in 1806, two years after our Author, has noticed this fascia under the name of the "internal inguinal ligament."—"Parti parietis abdominis antici inferiori in regione inguinis internâ sub tela cellulosa tenuis, sed firma, semipellucida, maximeque elastica incumbit membrana. Quæ a superiori horizontalis rami ossis pubis margine proxime pone breves fibras externas ligamenti inguinalis externi transparentes, neque minus pone teneros oblique introrsum descendentes fasciculos musculi obliqui abdominis interni tendinosos provenit. Hi quidem fasciculi, uti supra memoratum est, planum annuli inguinalis antici crurale constituunt." He adds, "Huic membranæ ligamenti inguinalis interni nomen tribuo."

Scarpa, mentions it as "Una tela sottile, in parte aponeurotica, in parte membranosa, alla quale Astley Cooper ha dato il nome di fascia transversalis." This author, however, as far as I can judge by the following passage, seems to think that this name is applied only to the outer portion of the fascia; for, after describing it as intended to supply the deficiency of the internal oblique and transverse muscles near Poupart's ligament, he adds, "Nella sede la piu debole della regione inguinale, cioè dall' arcata femorale al pube, la natura ha aggiunto alla tela trasversale un'altra tela veramente aponeurotica di figura triangolare, la quale si spiace dal lato esterno del tendine del muscolo retto dell' addome e si impianta in quel tratto del ligamento fallopiiano ovè e pressimo ad inserirsi nel pube." It appears evident that this weak part of the inguinal region can mean no other than the part where direct inguinal hernia protrudes, to strengthen which, this triangular portion of membrane is attached to Poupart's ligament. By reference to the plates of the second part of this work, it will be seen that this structure is described as a part of the same fascia, and effecting the purpose which Scarpa attributes to this triangular membrane; hence it appears that the "tela veramente aponeurotica" is the inner portion of fascia transversalis receiving a reinforcement of fibres from the tendon of the transversalis muscle.—Ed.

†Cloquet, who from his numerous and careful dissections is entitled to the consideration of anatomists, has bestowed great attention on the connexions of this fascia, which he justly observes, "Joue un rôle très important dans l'histoire des hernies inguinales, tant internes qu'externes. Supérieurement cette aponeurose que j'appellerai fascia transversalis, d'après M. Ast. Cooper, qui en a parlé le premier, se perd insensiblement en se confondant avec le tissu cellulaire qui couvre la face interne du muscle transverse, et se prolonge jusqu'à la face inférieure du diaphragme."—p. 25. The internal ring, he observes (p. 26.) is not to be considered as a simple aperture, but rather as the wide entrance of a funnel-shaped canal, which receives the spermatic vessels, and is continued upon them in the form of a sheath, accompanying them through the inguinal canal to the upper part of the testis. He describes the inner margin of the internal ring as being stronger than the outer, which has probably arisen from his considering the tendon of the transversalis muscle as part of the fascia. His description of this structure accords on the whole with that of our Author, although he had been unable to procure a copy of this work, and was obliged to trust to the necessarily imperfect extracts contained in other works upon the subject.—Ed.

The spermatic artery on each side is derived from the fore part of the aorta, below the origin of the emulgent arteries. It passes down behind the peritoneum over the psoas muscle, and, crossing the ureter, arrives at the internal ring, where it forms part of the spermatic cord. Artery.

The spermatic vein on each side arising from the testis, enters the abdomen with the cord, and accompanies the artery to the middle of the abdomen, where they separate; the right vein terminating in the inferior cava, the left joining with the left emulgent vein. Vein.

The vas deferens commences from the under and back part of the epididymis, forming with the latter the excretory duct of the testis; it accompanies the cord to the internal ring, and there leaving the spermatic vessels, descends over the brim of the pelvis by the side of the bladder to its ultimate destination in the urethra. The duct is frequently accompanied by a small artery derived from a branch of the internal iliac. Vas deferens.

These vessels, together with the accompanying nerves and absorbents, receive a double covering of peritoneum, which is derived from the part at which they quit the abdomen, and closely unites them together. This covering is called the tunica vaginalis of the spermatic cord. About an inch above the testis, the two layers separate to form a serous bag, which invests the gland anteriorly, and gives freedom to its motion. This bag is called the tunica vaginalis testis. Tunica vaginalis.

Between the upper and lower rings the cord receives the cremaster* muscle. It arises, under the tendon of the external oblique muscle, from the edges of the internal oblique and transversalis, descends into the scrotum upon the surface of the cord, and is attached to the tunica vaginalis reflexa of the testicle. This muscle is usually accompanied in its descent into the scrotum by a branch from the epigastric artery. Cremaster.

It appears, therefore, that the portion of the cord between the testis and the external ring is covered by a double peritoneal coat, formed by the tunica vaginalis, next by the cremaster muscle, and lastly by a layer of fascia sent from the tendon of the external oblique; that portion included between the two abdominal rings is also covered by the cremaster and tunica vaginalis; but, besides the fascia of the external oblique, it receives an additional covering from the tendon of the muscle. Within the cavity of the abdomen the spermatic vessels receive no other covering but that which is derived from the peritoneum.†

The space which the cord occupies between the external and internal abdominal rings is now called the inguinal canal. It is formed by the following parts: the posterior boundary is formed by the union of the tendon of the transversalis muscle and fascia transversalis. Below, the canal is completed by the crural arch, and anteriorly it is bounded by the tendon of the external oblique.‡ This canal seems to answer the purpose of preventing the ready protrusion of the abdominal contents; for, had the cord emerged from the abdomen immediately behind the external ring, few persons in the habit of much bodily exertion would be free from hernia; whereas, when the abdominal muscles are in action, the tendon and fascia behind the cord being pressed forward by the viscera, perform the part of a valve, and more completely shut up the passage against the descent of the viscera. Inguinal canal.

The epigastric artery is situated so near to the spermatic cord, and is so much concerned in the operation for hernia, that a most accurate knowledge of its course is absolutely requisite. This vessel arises from the external iliac artery behind Poupart's ligament, and, after a slight inclination downwards, passes upwards and inwards. At its commencement it is situated behind the fascia transversalis, and runs along the inner edge of the internal ring, where the spermatic cord crosses it nearly at right angles; taking its course behind the edge of the rectus, Epigastric artery.

* The origin of the cremaster has been variously described by authors; but later descriptions have added little to that given by Winslow:—"It arises partly from the ligamentum fallopii, and partly from the lower edge of the internal oblique muscle of the abdomen; and, on this account, it seems sometimes to arise from the spine of the os ilium; and it is probable that the musculus transversalis likewise contributes something to its formation."—p. 192. To the above remark, Cloquet affords an exception; his description of the cremaster differs from that of preceding anatomists, and appears to be correct, not only as being the result of elaborate dissection, but also as affording a probable explanation of the manner in which the cremaster is formed:—"Prior to the descent of the testis, the gubernaculum occupies the inguinal canal; and the lower fibres of the internal oblique, which appear relaxed, adhere to it as they pass to the pubes; as the testis descends, the fibres are necessarily drawn down into the scrotum, and thus form arches or loops, with their convexity downwards; and, in dissecting the cremaster of the adult, the fibres are found to arise from the lower edge of the internal oblique, to pass down on the outer side of the cord, and, having formed an arch on the fore part of the tunica vaginalis, to ascend on the inner side of the cord, and to be inserted into the pubes behind the lower pillar of the ring."—p. 15. *Op. Cit.*—Ed.

† A process from the inner margin of the internal ring may be traced upon the spermatic artery and vein for some distance in the abdomen, resembling the thin fascia sent by the outer margin along the cord within the canal.—Ed.

‡ The obliquity in the passage of the spermatic cord, previously to its emerging at the external ring, was known to Albinus, Camper, Cline, and to most anatomists who had paid any attention to the anatomy of hernia; but the cause of this oblique course was unknown to them, until shewn and explained by the Author. It was the proximity of the cord to the crural arch which more particularly engrossed their attention, on account of the danger of wounding it in the division of Poupart's ligament in the operation for strangulated femoral hernia. Thus, Benjamin Bell says, "The spermatic vessels, as they go along to pass out at the opening in the external oblique muscle, run nearly on the very edge or border of Poupart's ligament almost through its whole length."—*Vol. I. p. 347.*

Gimbernat also mentions the passage of the cord, in a canal on the upper edge of Poupart's ligament.—p. 32.—Ed.

it enters the sheath of the latter muscle, and ascends to inosculate with the internal mammary artery. In its course it distributes a branch to the cremaster, which descends on the cord, and also several to the abdominal muscles; it is also generally accompanied by two veins. Where the epigastric artery is crossed by the cord, it is distant about three inches from the symphysis pubis on one side, and from the superior spinous process of the ilium on the other.

Structure of the Parts concerned in Femoral Hernia.

In order to understand the parts directly and indirectly concerned in this intricate part of anatomy, and to comprehend the means that nature has adopted to give security to the contents of the abdomen at the upper part of the thigh, it will be necessary to describe the anatomy of the bones, and of the different fasciæ, which are formed at the groin.

Bones.

The distance between the symphysis pubis and the anterior superior spinous process of the ilium, is from five and a half to six inches, and if a line be drawn from one of these points to the other, the space beneath it will be bounded for half its length by the body of the pubes, and half by the ilium. About an inch and a quarter from the symphysis pubis (in the dried bone), upon its anterior and upper part, is situated the tuberosity of the pubes, or, as it has been improperly called, its spinous process. From this process a line is seen to extend obliquely backward and outwards along the upper part of the pubes, as far as its junction with the ilium; this line is called the linea ilio-pectinea, and assists in forming the brim of the pelvis.

About an inch and a quarter on the outer side of the tuberosity of the pubes, is a natural depression on the upper part of the bone, formed for the lodgement of the femoral artery, vein, and absorbents, which, upon its outer side, is bounded by a projection, marking the junction of the os pubis and ilium, and extending over the acetabulum.

On examining that part of the ilium which forms the outer boundary of the space mentioned above, it will be found, that two inches below the anterior superior spinous process, is situated another similar projection, called the anterior inferior spinous; and, that between the two, is a depression about an inch and a quarter in extent; immediately below the latter process is the acetabulum, and an inch anterior to it, is a flat surface extending to the os pubis.

It will be seen on dissecting the soft parts that fill up the space between the ilium and pubes, that they are wonderfully and beautifully adapted to the purpose for which they are designed; but it must be acknowledged, that their intricate connections render them of all parts in anatomy the most difficult to investigate, and to describe with perspicuity.

Ligament of the pubes.

The os pubis is covered by a ligamentous expansion, which forms a remarkably strong production above the linea ilio-pectinea, extending from the tuberosity of the pubes outwards, and projecting from the bone over that line. To this ligament the third insertion of the external oblique muscle, or, as it is commonly called, Gimbernats ligament, is attached. To obtain a clear view of it in dissection, the fascia covering the pectineus muscle, together with the muscle itself, must be cut away.

Superficial fascia.

The superficial fascia, which, in the anatomy of inguinal hernia, was described as covering the external oblique tendon, and descending into the scrotum over the cord, is found to have a very firm attachment to the lower edge of the crural arch; from thence it descends upon the absorbent glands of the groin, where it has been said to terminate; but erroneously, as it passes down upon the thigh, giving a covering to the absorbent vessels and superficial veins. The strongest fibres of this fascia are transverse; and though in its natural state it may readily escape the attention of the anatomist, yet, when it has been long pressed upon by a hernial tumour, particularly in a subject loaded with fat, it acquires considerable density. The covering which this gives to the femoral hernial sac, with the attachment it has to the edge of the crural arch, will be seen in the plates of the second part.

Fascia lata.

In a former part of the anatomical description it was mentioned, that Poupart's ligament gave origin to three fasciæ; one of the three which descends upon the thigh, and possesses great strength, is called *fascia lata femoris*. It may be said to have two distinct origins or attachments. The outer part, which is the stronger, arises from the whole of the lower edge of the crural arch, crossing the femoral artery and vein, the psoas and iliacus muscles, and the anterior crural nerve. The inner portion arises from the os pubis and the ligament of the pubes at the insertion of Gimbernats ligament, extends over the pectineus and triceps muscles, and unites with

the outer portion under the vena saphæna major. The united portions then form the fascia lata, which extends down the thigh, to envelop the muscles and support them when in action. *Vide Fig. 3. Plate II.*

When this fascia is first laid bare, the outer portion appears to be turned in under the femoral artery and vein; but, on further dissection, is found to form a sharp crescentic edge, which has been well described by Mr. Allan Burns, and is called by him the *fulciform process*. *Fig. 3. Plate II.* This falciform edge is connected to the fore part of the sheath containing the femoral vessels, and serves to strengthen it. It is seen covered by some tendinous fibres in the plates of the second part. When this fascia is dissected away, the muscles on each side are exposed, and the anterior crural nerve is laid bare; but the femoral artery and vein still remain enclosed in a sheath. The anterior part of this sheath appears at first sight to arise from the crural arch, but it may be readily detached from it by passing the finger behind the arch, where it will be found to be a continuation of the inner portion of the fascia transversalis.* In a former part of the description it appeared, that this fascia consisted of two portions; one, arising from the whole of the upper edge of the crural arch, ascends under the transversalis muscle, and forms the outer edge of the internal abdominal ring; while the inner portion, fixed by a firm attachment to the pubes, passes behind the tendon of the transversalis muscle, with which it is blended, and forms the floor of the inguinal canal. Through the inner side of the sheath next to the pubes, pass the femoral absorbent vessels into the abdomen; in the male subjects I have seen them enter the sheath in a cluster, through a single hole in this fascia; but in both sexes the fascia is generally rendered cribriform by these vessels passing through a variety of small openings; but, nevertheless, if the sheath be clearly dissected, and the finger thrust into it from the abdomen, the cellular membrane and absorbent vessels are protruded through one of these holes which is larger than the rest; some of the absorbents also pass between the artery and vein, and in some subjects even on the outer side of the artery, entering by two small openings in the anterior part of the sheath. *Plate II. Fig. 5, 4. Part 2nd.*

Fascia transversalis.

Of the Parts which shut the Abdomen from the Thigh.

When the peritoneum is dissected from the posterior surface of the abdominal muscles, from the symphysis pubis to the spinous process of the ilium, the space between these points of bone will be found to be occupied in the following manner:

From that part of the crural arch extending between the anterior superior spinous process of the ilium, to the outer edge of the external iliac artery, a strong fascia will be found to arise, extending upwards over the iliacus and psoas muscles; it may be traced inwards behind the femoral vessels, as far as the linea ilio pectinea, being attached at that line to the ligament of the pubes, and to the tendon of the psoas parvus, when that muscle is present. This fascia has been particularly described by Gimbernat, and should be called fascia iliaca. If the fascia iliaca be carefully traced, it will be found to arise from the outer half of the crural arch, in conjunction with the outer portion of the fascia transversalis, the latter ascending before the peritoneum, while the former passes up behind that membrane; they unite at the outer side of the transversalis muscle, and appear as one continuous production. By the union of these two fasciæ at Poupart's ligament, and their separation to inclose the viscera, the contents of the abdomen are thus received into a blind funnel,† and are prevented descending on the outer side of the iliac vessels. If the latter vessels be raised, the fascia iliaca will be seen descending behind them, as far down the thigh as the origin of the arteria profunda, thus forming the posterior part of the sheath. *Plate II. Fig. 1, 2.*

Fascia iliaca.

Thus a sheath is formed, enveloping the femoral artery, vein, and absorbent vessels, anteriorly by the descent of the fascia transversalis, posteriorly by a similar process from the fascia iliaca; and by the union of these at the inner and back part of the sheath the bag is rendered complete. At the upper part the sheath is broad, but as it

Femoral sheath.

* This inner portion arising from the pubes and linea ilio pectinea, instead of terminating, like the outer layer, at Poupart's ligament, winds in a semilunar direction along the outer edge of Gimbernat's ligament, from which it may be readily detached, and descending behind the crural arch passes over the femoral vessels, and thus forms the anterior part of the sheath.

It is singular that Cloquet, who has described the fascia transversalis as sending a process along Gimbernat's ligament, should not have been aware of its descent under the crural arch; speaking of Gimbernat's ligament, he says, (p. 60) "This ligament is formed in the generality of subjects of two very distinct layers, which are readily detached from one another above, but are united more closely below, to be inserted together into the crest of the pubes. Of these two layers, one is posterior and deeply seated, and is continuous with the fascia transversalis and the tendon of the rectus muscle; the other is anterior and superficial, and is blended with the inferior pillar of the ring." In the former layer will be recognized a correct anatomical description of the origin of the sheath as given by our Author, while the latter will be known as Gimbernat's ligament, properly so called.—p. 60. *Op. Cit.*—Ed.

† Speaking of the fascia iliaca, Cloquet says, "En se continuant avec le fascia transversalis, cette aponeurose représente une sorte de cul de sac fibreux, qui remplit l'angle rentrant fermé par le muscle iliaque et le paroi antérieure de l'abdomen, et qui s'oppose très puissamment au passage des viscères abdominaux au dessous de la partie externe de l'arcade crurale. Quand on a détruit ces deux aponeuroses, le péritoine se laisse pousser très facilement par le doigt entre l'arcade crurale et le muscle iliaque."—Ed.

descends, it becomes more closely applied to the femoral vein and artery, giving it the appearance of a funnel, as is seen in the plate. It is at the upper and inner part of this funnel that the absorbent vessels enter the sheath giving it, as has been already remarked, a cribriform appearance; this part of the sheath is much looser in its texture than the portion investing the artery and vein, which is firm and unyielding. *Fig. 3 and 4. Plate II.*

Contents of the sheath.

Femoral aperture.

If the sheath be opened the contents will be found separated by two membranous septa, one passing between the artery and vein, and a second, equally distinct, between the vein and the absorbents; the septum is formed by a process from the fascia transversalis passing backward, to attach itself to the fascia iliaca. The contents of the sheath differ in their attachment to the bag; the artery and vein are seen completely filling up the space in the sheath which is allotted to them; while the absorbents are loosely connected by means of cellular membrane and fat, which, not affording sufficient resistance to the pressure of the abdominal viscera, occasionally allows the descent of a hernia. *Fig. 9. Plate II.* It is this opening* in the inner part of the sheath, occupied by the absorbent vessels and cellular membrane, to which the term *femoral aperture*, as allowing the descent of a hernia, should be strictly applied. This aperture is situated between the lunated edge of Gimbernat's ligament and the inner side of the femoral vein. When viewed from the abdomen, after the peritoneum is removed, it appears filled with cellular texture, which, being elastic, readily allows the finger to pass for an inch below the crural arch.† If the finger be pressed forwards against the arch, the posterior edge of the latter may be distinctly felt; and even when Poupart's ligament is cut away, a tendinous unyielding band will be felt on the fore part of the sheath, where the latter is united to Poupart's ligament. The opening which allows the passage of the iliac vessels under Poupart's ligament is necessarily large, and can only be seen by removing the whole of the vessels, together with their sheath. The opening then appears to be of an irregularly oval shape, extending from the outer edge of Gimbernat's ligament to the junction of the fascia iliaca with the crural arch, and is bounded behind by the os pubis and its ligament, and before by the posterior edge of the crural arch. Its figure and boundaries will be seen delineated in *Plate II.*

Epigastric artery.

The epigastric artery, in its course to the rectus muscle, is distant from the femoral aperture, by which the absorbents enter, not more than three quarters of an inch. This vessel is subject to considerable variety in its origin; for, though it generally arises near the orifice of the sheath, it not unfrequently takes its origin an inch below its usual place; and, under this variety, approaches much nearer to the mouth of a hernial sac. When the thigh is extended, this vessel is drawn down into the sheath. The spermatic cord in the male, and the round ligament of the uterus in the female, entering the internal abdominal ring on the outer side of the epigastric artery, descend obliquely along the inguinal canal; in their course the cord is separated from the femoral aperture by the fascia transversalis, which lies immediately above that opening and the crural arch. The proximity of the cord to the mouth of a femoral hernial sac should be borne in mind.

Arteria circumflexa ilii.

The arteria circumflexa ilii arises from the external iliac artery, nearly opposite to, but a little below, the epigastric artery; and passing into a groove, formed by the common origin of the fascia iliaca and transversalis, it is continued towards the inner part of the superior spinous process of the ilium.

Vena saphena major.

The vena saphena major enters the crural sheath about an inch below the crural arch, and terminates on the inner side of the femoral vein.

* Scarpa, in his work already alluded to, differs from our Author in opinion regarding the opening by which a femoral hernia descends. After giving a correct account of our Author's anatomical views on the subject, he adds, "I am sorry that I cannot be of this opinion, and that I feel myself obliged to declare that, in my judgment, this eminent surgeon has comprised under the expression *sheath of the femoral vessels*, two parts distinct from each other: viz., the aponeurotic sheath of the vessels, properly so called, and the crural canal." The views of Professor Scarpa by no means accord with those entertained by Sir Astley Cooper, as will appear from the Professor's plate xi. fig. 3., in which he gives a view of the "Anello crurale spogliato della sottile membranella cribrosa che gli faceva di coperchio." The membrane which is removed to produce this view, is not merely a cribriform membrane which covers the aperture, as described by the Professor, but is the strong tendinous attachment of the fascia transversalis to the pubes, where it begins to form the femoral sheath. It is probable, however, that the difference of opinion existing on this and other points of the anatomy of hernia, arises principally from the different mode of prosecuting the dissection. A correct idea of the sheath is only to be obtained, by first clearly dissecting the inner portion of the fascia transversalis and the tendon of the transversalis muscle, and detaching the former from Gimbernat's and Poupart's ligament.

Mr. Hey, whose authority must ever be quoted with respect, has described the covering given to a hernial sac by the femoral sheath, but has entirely omitted the intervention of the sheath between the neck of the sac and Gimbernat's ligament, as will appear from the following passage:—"The hernia in its descent passes through a foramen, formed on its inner side by Gimbernat's ligament, on its anterior part by that ligament and the fascia lata conjointly, and on its outer side by that portion of the sheath which immediately surrounds the femoral vein."—*Hey's Surgical Observations*. p. 147.

Mr. Lawrence gives the following account of this opening:—"A small space is left between the iliac vein and the thin border of the tendon, not closed towards the abdominal cavity, and, consequently, affording an opportunity for the occurrence of hernia. The space in question is bounded above and in front by the crural arch, below and behind by the pubes, on the internal or mesial side by the border of the tendon, and on the outer or lateral aspect by the crural vein."

In every dissection which the Editor has made of this part, he has found, that after the crural arch and Gimbernat's ligament were entirely removed, the canal receiving a femoral hernia remained as perfect as when those tendons were entire; and if the finger be introduced into the aperture, it will be found, that an intestine cannot escape under the crural arch without entering the bag formed by the funnel-shaped portion of the femoral sheath.—*Ed.*

† To this cellular membrane Cloquet gives the appellation "septum crurale."—"L' orifice superieur du canal crural est fermé par une cloison membraneuse qui s'oppose à la formation de la hernie crurale, ainsi qu'à l'introduction du doigt, qu'on pousse de haut en bas, au dessous de l' arcade crurale."—*Ed.*

The difference in the structure of these parts in the male and female, which chiefly conduces to the production of hernia, is well explained by Dr. Monro, Jun., in his "Observations on Crural Hernia." The oval space forming the orifice of the crural sheath is larger in women than in men. The distance from the spine of the ilium to the symphysis pubis is greater, and, consequently, the crural arch is wider. The third insertion of the external oblique muscle is not so deep in the male as in the female. The psoas and iliacus internus occupy less space in the female than in the male. I have generally found this disease in women who have a very large pelvis, in whom the ilium and pubes project more than usual.

Difference of structure in the male and female.

Mode of Dissecting the Parts concerned in Inguinal and Femoral Hernia.

Having been in the practice of preparing anatomical views of these parts for the Author's lectures, and of demonstrating them to the pupils of the anatomical school, I have ventured to add to the preceding account of their structure, the following succinct description of the method I have usually adopted in displaying them. A regular mode of dissection is required, to develop this intricate structure, as the connexion of the different fasciæ cannot be clearly understood without some systematic arrangement: to the young anatomist it is indispensable, to render the subject at all intelligible; to the more experienced dissector it is not without its use, in clearing up those numerous, though perhaps unimportant, discrepancies of opinion on the subject, which, even in the present advanced state of anatomical science, exist among its professors. In justice also to our Author, whose descriptive anatomy is founded on the most elaborate dissection, it should be stated, that the correctness and consequent value of his labours can only be estimated by following him in the steps which first led him to adopt these views of the anatomy of hernia, and which even at present seem not to be understood to their full extent by the anatomists of the day.

The integuments are to be removed by making a direct incision from the superior spinous process of the ilium to the linea alba, and a perpendicular one from the symphysis pubis to meet the former; these will form a triangular flap, which is to be turned back as far as Poupart's ligament, to display the *superficial fascia*: in reflecting this fascia in a similar manner, it will be found to adhere loosely to the tendon of the external oblique, but firmly to the upper column of the ring and Poupart's ligament, from which latter it should not be detached; it may then be traced into the scrotum covering the cord, from which it may be separated by passing the finger down between them, and the fascia will appear as a bag surrounding the spermatic cord; the columns of the abdominal ring will not be distinct, until they are divested of a thin membrane sent down upon the cord from their edges, which appears polished like a serous membrane. The cord, being detached from the ring, will be seen taking its course into the scrotum over, or, in relaxed subjects, on the outer side of the spinous process of the pubes. The situation, direction, form, and structure of the abdominal ring will then be clearly viewed as described by the Author.

The tendon of the *external oblique* is next to be reflected, by an incision begun at the spine of the ilium, and carried towards the linea alba, the dissector taking care, when he reaches the linea semilunaris, not to divide the tendon of the internal oblique; and should he find these tendons blended before he reaches the linea alba, the incision should then be continued from the point of union to the symphysis pubis. The *internal oblique* muscle being thus exposed, its lower fibres are to be divested of their cellular membrane and fat, and by drawing them tense, the defined edge of its tendon will be seen passing into the body and spine of the pubes; the line of division should be traced between the internal oblique and cremaster muscles, and the former detached from Poupart's ligament and turned upwards; in separating it from the transversalis, it is generally impossible to avoid cutting some fibres of both, as the margins of the muscles are more or less blended, except towards the spine of the ilium, where a branch of the circumflex artery forms a division between them. Also in separating the internal oblique from the cremaster, a few muscular fibres must, in some subjects, be divided. The *transversalis* being laid bare, in the direction of its muscular fibres will be found to resemble the former muscle, while the tendon has quite a different attachment; by pulling the fibre a defined edge cannot be observed, as in the oblique, passing to the pubes; on the contrary, the lower part of the tendon, with occasionally a few muscular fibres, is seen passing down behind the cord towards the under margin of the crural arch, and firmly connected to the subjacent fascia; it is by the union of this tendon and fascia that a direct hernia is prevented taking place, and, when the abdomen is opened, by pushing the finger against the peritoneum at this part, it will be seen, that such a hernia will protrude before it the tendon of this muscle and the fascia, unless, which is sometimes the case, the fibres happen to give way, and allow the intestine and sac to pass between them.

The transversalis is to be reflected in the same manner as the internal oblique, which will expose the outer portion of the fascia transversalis, and shew the formation of the internal ring; but previously, the cremaster, which has hitherto been left attached to the cord, is to be separated from it by the handle of the knife, but is not to be detached from Poupart's ligament, from the central third of which it usually takes its origin. The cord, which is now exposed, is found connected on all sides by a very fine tela, which readily allows it to be raised from its bed, as far outwards as the internal ring, where it first makes its appearance in the inguinal canal. These connexions are to be separated; and, when the cord is raised, it will be found connected at the inner ring by a thin process to the fascia transversalis, from which it is to be separated by passing the handle of the knife under the outer margin of the ring, which is always evident, and which may be traced along the upper edge of Poupart's ligament as far as the pubes. Thus it will be seen, that *this outer portion of the fascia* arises from the whole of Poupart's ligament, broad on the outer side of the cord, but, as it passes below it, forming a falciform curvature, and ending in a narrow band at the pubes. The inner boundary of the ring is also to be separated from the cord by the handle of the knife, and will be found to pass backward towards the peritoneum, to which it has a firm attachment. If the finger be passed through the internal ring, the external iliac artery may be felt lying behind it, and it will be seen how greatly a knowledge of this aperture will facilitate the operation of tying this vessel. *The fascia forming the inner margin* of the opening has no immediate connexion with the outer portion, except above the cord; towards Poupart's ligament it is seen lying behind the cord, and forming the floor of the inguinal canal, and intimately or even inseparably connected with the tendon of the transversalis muscle, by which contrivance the fascia is rendered tense during the contraction of the muscle, and security afforded against a direct hernia; in tracing it towards Poupart's ligament, it will be found to pass behind the outer portion of the fascia, and to have so slight a connexion with the posterior edge of the crural arch, as readily to allow the handle of a knife to pass between them; its attachment to Gimbernat's ligament may also be now examined, from which it is to be separated by a careful dissection, in order to display the form and attachment of this insertion of the external oblique, and the attachment of the fascia to the pubes behind Gimbernat's ligament, the full extent, however, of which cannot at present be seen. The strength of this fascia will vary according to the strength of the transversalis tendon; when the latter is strong the former will be slight in texture, and *vice versa*. It may (but not at present) be traced behind the rectus, intervening between that muscle and the peritoneum, but at this part it becomes more cellular, and where the fascia transversalis ascends behind the transversalis muscle, it may be traced as high as the diaphragm. This part of the dissection displays an important structure in femoral hernia, viz., the commencement of the femoral sheath, which hereafter will be seen to be partly formed by the inner portion of the fascia transversalis, which, from its attachment to the pubes, passes down in a funnel form along the lunated edge of Gimbernat's ligament to form the anterior part of the sheath. The course of the epigastric artery, behind or sometimes between the layers of the inner portion of the fascia transversalis, is now to be ascertained, as also its direction behind the cord, and its approximation to the inner margin of the internal ring; this must be done without destroying the fascia, as the latter is materially concerned in the anatomy of *femoral hernia*, which may now be investigated.

The integuments are to be removed from the fore part of the thigh by continuing the incision downwards from the spine of the pubes for at least four inches, in a perpendicular direction, from the termination of which a second incision is to be carried across the fore part of the thigh, so as to allow a flap to be reflected outward. The superficial fascia will be found much stronger below Poupart's ligament than on the abdomen, and consisting of two indistinct layers including the superficial veins: before removing it, its attachment to Poupart's ligament must be particularly noticed; if the fascia which has been raised from the abdomen be extended, it will be found to send a process to Poupart's ligament, which has a very firm connexion with it. This process is somewhat polished, and, in a femoral hernia, yields and gives a distinct covering to the tumour: when divided from Poupart's ligament it will be seen to lie over a fossa, in which a femoral hernia is received. In removing the superficial fascia, care must be taken not to injure the sheath; to prevent which, the separation is best effected by finding the vena saphæna major, and dissecting the superficial fascia from the fascia lata, first on the inner side of the vein as high as the lower column of the ring, and continuing the dissection behind the sheath of the vessels till the fascia lata unites with the posterior part of the sheath; this will lay bare the lunated border of the fascia lata under the saphæna vein, and by following this border outwards the superficial fascia will be removed without destroying the falciform edge of Burns; this edge, like the outer margin of the internal abdominal ring, is indistinct till detached from the fore part of the sheath, to which it

Measurement.

The following measurement of the parts I have described was made from subjects, which appeared to be well formed; and although the precise distance will vary according to the size of the person, the relative proportion of the parts will be preserved.

Male.

	<i>Inches.</i>
Symphysis pubis to the anterior superior spinous process of the ilium . . .	5 3-4ths.
_____ to the tuberosity of the pubes	1 1-8th.
_____ to the inner margin of the external abdominal ring . . .	0 7-8ths.
_____ to the inner edge of the internal abdominal ring	3
_____ to the middle of the iliac artery	3 1-8th.
_____ to the middle of the iliac vein	2 5-8ths.
_____ to the origin of the epigastric artery	3
_____ to the epigastric artery on the inner edge of the internal abdominal ring	2 3-4ths.
_____ to the middle of the lunated edge of the fascia lata	3 3-4ths.
_____ to the middle of the crural ring	2 1-4th.
Anterior edge of the crural arch to the saphæna major vein	1

Female.

Symphysis pubis to the anterior superior spinous process of the ilium	6
_____ to the tuberosity of the pubes	1 3-8ths.
_____ to the inner margin of the external abdominal ring	1
_____ to the inner edge of the internal abdominal ring	3
_____ to the middle of the iliac artery	3 3-8ths.
_____ to the middle of the iliac vein	2 3-4ths.
_____ to the origin of the epigastric artery	3 1-4th.
_____ to the epigastric artery on the inner edge of the internal abdominal ring	2 7-8ths.
_____ to the middle of the lunated edge of the fascia lata	2 3-4ths.
_____ to the middle of the crural ring	2 3-8ths.
Anterior edge of the crural arch to the vena saphæna	1 1-4th.

generally sends a connecting process. The glands and superficial veins may now be removed with the superficial fascia from the fore part of the sheath, care being taken that the sheath be not opened, to avoid which, some of the cellular texture uniting the glands and absorbents should be left. The form and appearance of the inner portion of the sheath will now be made evident, as delineated in the Author's plates.

The abdomen may now be opened by continuing the first angular incision into the abdominal cavity, and the part, where a femoral hernia first protrudes, examined; it will be readily recognised by a loose fold of peritoneum formed by the contiguous passage of the umbilical artery, which allows the finger to be passed down some distance below Poupart's ligament; while the finger of an assistant is within the canal, an opening is to be made in that part of the sheath covering the femoral vein, and the bag enveloping a femoral hernia will be readily understood: it will be seen that the finger is not in contact with the vein, but is enveloped in a sort of protruded bag, formed by that part of the sheath admitting the entrance of the absorbents. The peritoneum may now be carefully detached by the hand from the fascia transversalis, beginning on the outer side; in doing which, the process connecting the inner margin of the internal ring to the peritoneum, will be seen passing for some distance upward along the spermatic vessels. The aperture of the femoral sheath, divested of peritoneum and viewed from the abdomen, appears filled with elastic cellular and adipose membrane, which will be found to yield before the protruded finger, and thus assist in forming a covering to the hernia; this adipose membrane, where the absorbents enter, also explains the cause of the peritoneal sac of a femoral hernia being covered by fat, which gives this covering the character of omentum. If the parietes be stretched, the dissector thinks he has an internal view of Gimbernat's ligament forming its lunated edge; this tendinous process, however, cannot be seen till the inner portion of the fascia transversalis be more completely dissected from it, by doing which the process sent by this fascia to the linea ilio pectinea will be seen connected with Gimbernat's ligament, and thus giving rise to the erroneous idea of the latter consisting of two layers. The fascia transversalis, being detached from Gimbernat's ligament, may now be easily separated from the posterior edge of the crural arch by the handle of the knife, and the continuation of the fascia to form the femoral sheath may be seen. The knife may now be passed between the fore part of the sheath and Poupart's ligament, and divide the latter so as to remove any constriction arising from Gimbernat's and Poupart's ligaments; let the finger be introduced into the mouth of the femoral sheath; notwithstanding the entire removal of the above ligaments, a band will be found stretching across the fore part of the sheath, and presenting a very evident cause of constriction to a femoral hernia; it is in consequence of the unyielding nature of this band that the mouth of a femoral hernial sac is so narrow, and the consequent chance of reducing the gut when strangulated is so much smaller in this species of hernia than in the inguinal; the perfect state of the bag formed by the sheath, into which a femoral hernia must necessarily pass, may also be satisfactorily ascertained. The septum, which separates the absorbents from the vein, and also that which divides the vein and artery, can be seen by making two small incisions in the sheath, so as to lay bare each vessel.

The peritoneum is then to be reflected from the iliac muscle, which will lay bare the iliac fascia, a strong dense membrane covering the iliacus and psoas muscles, and appearing as a continuation of the outer portion of the fascia transversalis; by its arising from the outer half of Poupart's ligament in conjunction with the outer portion of fascia transversalis, the dissector will understand how the viscera are prevented descending upon the thigh between the femoral vessels and the spinous process of the ilium. The fascia iliaca may be traced inwards, behind the iliac vessels, as far as the linea ilio pectinea, and joining the tendon of the psoas parvus, it takes off that sharpness from the brim of the pelvis, which, in the skeleton, might seem prejudicial to the pregnant uterus; it blends insensibly with the fascia of the pelvis. If the iliac vessels be raised from their bed, the fascia will be seen descending into the thigh as low down as the profunda, and forming the back part of the sheath; and, to the inner side of these vessels, it will be found to be continuous with the pubic portion of the fascia lata. By rotating the thigh inwards and flexing it, the dissector will observe the relaxation produced in the different fasciæ, and the importance of attending to these motions of the limb in the attempt to reduce a hernia. The course of the crural nerve behind the iliac fascia and its consequent exclusion from the femoral sheath, precludes the possibility of including the nerve in the operation upon the external iliac artery.—ED.

CHAPTER III.

*The Oblique or Common Inguinal Hernia.**

THE different kinds of herniæ are subdivided into several distinct species :

Of the inguinal there are four :

The oblique, or that which takes the course of the spermatic cord in the male, and the round ligament of the uterus in the female :

The direct, which passes immediately from the abdomen through the external abdominal ring, so that its direction from the scrotum into the abdomen is not attended with that obliquity which characterizes the former :

The congenital, in which the protruded viscus is found within the cavity of the tunica vaginalis :

The encysted hernia of the tunica vaginalis, in which an additional membranous sac is formed within that peritoneal sheath.

The oblique makes its first appearance at the internal ring in the form of a small tumour, situated about an inch and a half to the outer side of the external abdominal ring, in a line extending from the pubes to the anterior superior spinous process of the ilium. First appearance.

If its progress be uninterrupted, it proceeds gradually obliquely downwards and inwards in the direction of the inguinal canal as far as the external ring. Direction.

As long as it remains within the canal its existence is often not suspected by the patient, because it requires a careful examination to detect it; but to a surgeon acquainted with the natural feel and appearance of the parts it is sufficiently obvious. The length of the swelling above the ring will be found the same as the part of the spermatic cord included between the upper opening and the abdominal ring; that is, about an inch and a half in the adult subject. Unsuspected.

The tumour next descends through the abdominal ring into the scrotum (here taking the name of scrotal hernia), and being now less confined than before, it forms a distinct swelling, sufficient to awake the patient's attention, who now, generally for the first time, is led to require surgical assistance. As the growth of the tumour, when in the scrotum, is little restrained by external pressure, it increases to an almost unlimited, and sometimes enormous size. One of the largest of these swellings which I have ever seen, was in a man who was sent to me to Guy's Hospital by Mr. White, surgeon at Lambeth. It reached to the patient's knees, its length was then twenty-two inches, and its circumference thirty-two. Another measurement, taken by Mr. White, when it had been for some hours strangulated, gave thirty-four inches for the circumference, and twenty-two for the length. Descent into the scrotum.

When an inguinal hernia is dissected, immediately under the skin of the scrotum is found a fascia of greater or less thickness according to the duration and size of the tumour. This fascia is given off by the tendon of the external oblique muscle above the abdominal ring. In general it appears little more than a condensed cellular membrane, but I have seen it in old herniæ as dense as the fascia that covers the muscles on the outer part of the thigh.† *See Plate.* Size.

Under this fascia is the cremaster muscle, which forms another covering to the hernial sac; for this muscle, in passing through the inguinal canal, is united both to the fascia and to the sac, it is easily separable from both, Dissection.

* Hesselbach has called this kind of hernia "external," in contradistinction to that which passes to the inner side of the epigastric artery. The term "oblique" appears to be more appropriate, as it denotes the oblique course of the hernia through both abdominal apertures.—ED.

† Scarpa, although he has alluded to this covering under the name of "aponeurotic web of fascia lata," has not given a separate description of it in his plates, and leads us to understand that the external ring is defined and free from any extensive adhesions to the exterior envelope of a hernial sac; this may perhaps be owing to his thinking this covering as not deserving a separate description from the cremaster. There is, however, an evident anatomical distinction between them. The cremaster may be seen coming from under the edge of the ring, free from any close attachment to the margin of the tendon. The superficial fascia, on the contrary, comes off as it does in the healthy state, from the edge of the ring, and forms a covering to the cremaster, sometimes cellular, at other times thin on the fore part, and dense on either side; and in herniæ of long standing, it frequently acquires such density, as to appear to be a prolongation of the external oblique tendon. In the operation it should be borne in mind, that the margin of the ring is not always distinct, being often obliterated by its junction with the superficial fascia. Mr. Lawrence bestows the following notice on the fascia :—"Some tendinous fibres, derived from the aponeurosis of the external oblique, where it forms the lower opening of the abdominal canal, may be occasionally seen in this external investment (cremaster). The pressure of the tumour occasions a considerable thickening of the parts in old herniæ, where several distinct layers may often be recognized."—p. 172. *Op. Cit.*—ED.

however, by dissection. This muscle becomes much more extended and thicker in hernia, than in the natural state.*

Sac.

When the fascia and the cremaster muscle are removed, the proper hernial sac becomes exposed to view. This is thinner than the two former coverings, but somewhat thicker than the peritoneum, from which it is immediately derived. Many writers have represented the sac as much denser than it really is, mistaking the two above-mentioned coverings for the sac itself.† See *Plate*.

Spermatic cord.

Situation of the
sac in the canal.

Behind the hernial sac lie the spermatic cord on the upper part, and the testicle on the lower; so that the sac is situated between the cord and the cremaster muscle, anteriorly to the former and posteriorly to the latter. The direction of the hernia above the abdominal ring is obliquely upwards and outwards towards the spine of the ilium, the same as that of the spermatic cord. Above the ring, the hernial sac is covered by the tendon of the external oblique muscle; the spermatic cord is still behind it, and further backwards are the tendons of the internal oblique and transversalis muscles and the fascia before mentioned.‡ At the internal ring the sac communicates with the cavity of the abdomen; this part is called its mouth, and is generally, though not always, its narrowest dimension. Between the mouth of the sac and the symphysis pubis passes the epigastric artery. This vessel runs in some degree under the sac and along its inner side. There is no vessel of importance above the mouth of the sac, nor externally, that is, between it and the spinous process of the ilium. See *Plates, and coloured Plate at the end of Part 2nd*.

The above description of the situation of the hernial tumour, in regard to the abdominal openings, applies only whilst it remains of small size; for when a hernia has existed a considerable length of time, and has carried with it a large portion of the abdominal viscera, the constant pressure dilates the parts in each direction, extending the opening through which it passes from the abdomen, slightly towards the spine of the ilium, but more especially towards the symphysis pubis. Hence it is that in old and large herniæ the internal ring is brought to be almost in contact with, and opposite to, the external abdominal aperture.

Gradual enlarge-
ment of its mouth.

This difference will be distinctly seen in the plate which represents a hernia on each side; on the right, a small one, in which the mouth of the sac is at the greatest distance from the abdominal ring; on the left a large hernia, the mouth of which approaches very closely to the ring. This change by gradual enlargement, however, makes no alteration in the relative position of the epigastric artery, except in giving it a greater curve; for its course is still on the inner side of the mouth of the sac.

Varieties in
situation.

It has been stated that the hernial sac in its descent is anterior to the spermatic cord. This is its most frequent situation, but varieties occur in this respect which the surgeon should keep in mind during the operation. Thus the cord is sometimes found separated, and the hernial sac protruded between its vessels. This circumstance is represented in *Plate V.*, taken from a preparation in my possession, in which the vas deferens is seen passing on one side of the sac, and the spermatic vessels on the other. In another case, which I shall afterwards describe, I

* In conformity with the laws which regulate the increase of muscular fibre in proportion to the demand, the cremaster becomes extremely thickened, the fibres sometimes acquiring the width of the finger. The cellular membrane circling the fibres in a healthy state, not only yields from the pressure, so that the fibres of the muscle appear disgregated, but also become thickened; and thus, on the anterior and lateral parts of the tumour, a very dense covering is produced, which adheres both to the hernial sac and superficial fascia, especially to the latter. This covering is by far the strongest in the dissection of an oblique hernia.—Ed.

† It is clearly ascertained by the dissections of modern pathologists, that the sac differs but little from the healthy peritoneum. The older writers used to consider it as being always thickened; when such change takes place in the density of the sac, it must be regarded as an exception to a general rule.—Ed.

‡ There is no part of the anatomy of inguinal hernia which has so important a claim on the attention of the practical surgeon, as the connexions of the hernial tumour between the two abdominal rings. It is not, perhaps, affirming too much to say, that in by far the greater majority of strangulated oblique herniæ, the cause of strangulation will be found at the inner ring; such a statement will, I apprehend, accord with the experience of those who have frequently operated in this disease, and will also shew the importance of a correct understanding of the structure of this part. When a hernia is situated in the inguinal canal, or making its appearance at the external ring, the obliquity of the canal is preserved; in the course of time, however, by the constant pressure of the tumour, the internal ring is forced inwards towards the pubes, till it meets the unyielding tendon of the transversalis muscle; this tendon being attached to the fascia transversalis, near the pubes, becomes raised over the hernia in the form of an arch, the muscular fibres first passing horizontally over the tumour, while the tendon dips deeply to its inner side to blend with the fascia transversalis. In the dissection of a hernia, this tendinous loop or band can readily be felt by passing the finger up through the external ring, and will demonstrate one cause of a hernia becoming strangulated at the internal ring. It has been matter of dispute whether the sac receives a covering from the process of fascia sent down upon the cord from the outer margin of the inner ring; in the dissections I have made to ascertain this point, I have found that the peritoneal sac is covered by a thin layer of membrane continued from the edge of the fascia transversalis, but preserving so little the character of fascia, as to be of little importance in a practical point of view. Cloquet observes, "Les hernies inguinales externes descendent d'abord dans l'entonnoir membraneux du fascia transversalis." Scarpa attaches considerable importance to the cellular covering found between the cremaster and sac. He has described it in his second plate as forming a distinct layer enveloping the hernial sac, under the appellation of "La cellulosa esteriore del peritoneo la quale circonda ed accompagna il sacco erniario dal di dentro del ventre seno nel fondo delle scroto. Questa cellulosa nell'ernie scrotali di mediocre volume mantiene la naturale sua mollezza e flessibilità, ne si presenta sott' altra forma, che quella d' una suffice spugnoza sostanza, interposta fra la guaina del cremastere ed il sacco erniario fatto del peritoneo."—p. 19. In fat subjects a quantity of adipose structure, situated at the internal ring, is not unfrequently protruded before the sac, and appears to give it a distinct covering; but in the majority of inguinal herniæ, this cellular membrane, alluded to by Professor Scarpa, differs so little from that which unites the other coverings, as not to merit any particular notice, except in the instance of fat presenting itself under the cremaster, when, as in femoral hernia, it is liable to be mistaken for omentum. The course of the epigastric artery, in regard to the neck of the hernial sac, is uniform in all cases of oblique hernia, notwithstanding the opinions of some respectable authors to the contrary. The only difference, if such it may be called, in the course of this vessel in different subjects, exists in the greater or less curve it forms in its passage around the back and inner part of the hernial sac; when the hernia is large, of long standing, and by pressure has destroyed the obliquity of the inguinal canal, the curve of the vessel becomes considerable, forming nearly a semi-circle with its convexity towards the pubes.—Ed.

met with the spermatic artery and vein passing before the sac and the vas deferens behind it. It has been stated, but this I cannot give from my own observation, that the whole of the cord is sometimes anterior to the sac.*

For the following case, in which the vas deferens was situated on the fore part of the tumour, and unfortunately divided in the operation, I am indebted to Mr. Shepperd, surgeon at Worcester. Case.

Worcester; December 5th, 1814.

Dear Sir,

I have taken the liberty of sending you an account of a case of scrotal hernia that occurred in this neighbourhood about three weeks ago. The parts sent are precisely in the state I found them, having been examined after death by the operator. The particulars of the case were as follow:—The patient had been subject to hernia for some years, and during sleep he awoke with symptoms of strangulation; the usual remedies failing to afford relief, he submitted to the operation about forty hours after strangulation commenced. The tumour was very large, and in its descent had separated the spermatic cord; the artery and vein passed down on its *inner side*, the vas deferens on the *anterior part*, which *latter* vessel was divided in the operation, and noted by a person present. The man died in about twenty-four hours after the operation; his body was then hastily examined, and a portion of the vas deferens removed, which I have supplied by a piece of tape. A few days afterward it was reported to me by a gentleman present at the operation, that the whole cord had been divided by the operator, but without any hæmorrhage following: knowing that varieties of this kind were rather unusual, and not being able satisfactorily to account why the artery did not bleed *if divided*, I felt a strong desire to ascertain whether this was the fact or not; and having obtained possession of the body, I found them as before described. I am aware that the cord has frequently been found separated by the descent of the hernia, but rarely, I believe, precisely in this manner, the spermatic vessels most commonly having been found on each side of the tumour when any division has occurred; though I rather think Mr. Hey has given a case where the vas deferens crossed over the anterior and *inferior* part of a hernia that he was operating on, and which he also unfortunately divided. Knowing the great interest you take in every thing at all elucidating the subject of hernia, I thought this case might be worth detailing.

Your obliged and obedient Servant,

JAMES SHEPPERD.

The inguinal hernia is very generally pyriform, small towards the ring, and enlarging as it descends. It occurs much more frequently on the right than the left side. Form of the hernia.

The symptoms and circumstances whereby this disease may be distinguished from other tumours with which it is liable to be confounded, are the following:

First, When the patient is desired to cough, the tumour becomes immediately distended, owing to the pressure of the abdominal muscles forcing down into the sac more of the viscera or their contents. Distinguishing symptoms.

Secondly, The patient can usually state from his remembrance, that on the first appearance of the tumour in the groin, it used to return into the abdomen when he was in a horizontal posture, and to reappear on standing erect; though circumstances may have long prevented this symptom from continuing.

Thirdly, The progress of the tumour is described by the patient as having commenced at the groin, and proceeding gradually downwards into the scrotum.

Fourthly, When the tumour contains intestine it is elastic and uniform to the touch; and on being pushed up into the abdomen, it returns with a gurgling noise. But when omentum is contained, the tumour is less equal on its surface, receives an impression from the fingers, is heavier than in the former case, and is not attended with any peculiar sound when returned into the abdomen. Most commonly, however, both intestine and omentum are the contents of the hernia, a circumstance which impairs the accuracy of any very nice distinction by the touch; though still on pushing back the contents of the tumour, the presence of intestine, which returns the first, will often be indicated by the gurgling noise, whilst the more solid omentum may be felt going up after it.

Lastly, The functions of the viscera are somewhat interrupted. Eructations, nausea, constipation, colic pains, and distention of the abdomen occur; and pain is produced by violent exertions, coughing, or sneezing. These are the symptoms that generally give the patient some suspicion of the nature of the complaint.

* It has been asserted by Le Dran, and other surgeons of repute, that they have met with the whole spermatic cord on the fore part of the hernial sac in operating on large herniæ. Of this, however, I am disposed to require more conclusive evidence, than the imperfect dissection and separation of the tunics of a hernia during an operation can afford. In Mr. Shepperd's case, it appears that the operator was under the apprehension of having divided the whole of the cord; whereas, dissection afterwards proved that the vas deferens was the only vessel found on the anterior surface of the sac, having been separated from the artery and veins. If it happens that the entire cord is ever found anterior to the hernial sac, it cannot proceed from the pressure of the tumour; and it is difficult to conceive how it can arise from any accidental variety in the relative situation of the spermatic vessels at the orifice of the sac, as an examination of the natural course of these vessels behind the peritoneum will shew. The most frequent variety met with is that in which the tumour has forced the vas deferens to its inner side; two instances of which are delineated by Camper, and two also described by Mr. Hey; and as the tumour acquires bulk, this vessel gradually advances before the *lower* part of the sac. A careful operator will bear in mind this frequent change in the situation of the cord, and will check his hand on finding a vascular band under his knife; but as there is no necessity for opening the lower part of the sac, there is but little risk of wounding the spermatic vessels, which are rarely found, as Scarpa has justly observed, on the fore part of the sac so high as the external ring. The late Mr. Hey, in operating on an inguinal hernia, divided the vas deferens, which has induced him to advise the free division of the scrotum, before the other coverings of the hernia are opened. Scarpa also has detailed a case in which he wounded the spermatic artery in puncturing a large hydrocele, the same change having taken place in the situation of the vessels as occurs in large herniæ.—Ed.

Diseases with
which it is liable
to be confounded.

However, there are several diseases of the groin and scrotum with which hernia is liable to be confounded; so that there are few surgeons who have seen much of hernia who have not frequently witnessed mistakes, made even by medical practitioners, which have led to the application of trusses in diseases where they are not only useless, but even productive of much injury. The reputation of the surgeon, and the safety of his patient, require of him a very accurate attention to this point.

Hydrocele.

A hydrocele of the tunica vaginalis testis resembles hernia in its form, but may be distinguished from it by the following marks. The hydrocele begins to form at the lower part of the scrotum, and gradually extends towards the ring; it also involves the spermatic cord and testis, so as to render them with difficulty distinguished by the touch, whilst in hernia they may, in general, be readily felt behind the tumour. Hydrocele gives a fluctuating feel when struck with the finger, does not become dilated when the patient coughs, and appears semi-transparent when a lighted candle is held by its side.

I have seen cases of hydrocele, however, in which there was unusual difficulty in deciding upon the nature of the complaint. When it becomes so large as to extend upwards through the abdominal ring to the abdomen, the form of the tumour is precisely the same as that of hernia, and it even dilates when the patient coughs, owing to the sudden pressure upon that part of it which lies above the ring. The transparency, the fluctuating feel, and the observed progress of the swelling from below upwards are then the only distinguishing marks.

A tumour sometimes appears in the scrotum which descends in the erect posture, returns when the body is recumbent, distends upon coughing, fluctuates, and is transparent. This disease is a collection of water which runs backwards and forwards between the cavity of the abdomen and that of the tunica vaginalis, owing to the opening of this membranous sheath never having been closed. When this disease is complicated with ascites it becomes distended to an enormous size. It is readily distinguished from hernia by its transparency, which may always be observed.

Cyst upon the cord.

Water sometimes collects in a cyst upon the spermatic cord, forming a hydrocele of the cord. When it is placed entirely below the ring, its want of connexion with the abdomen readily distinguishes it from hernia; but when it passes within the ring to the abdomen, some difficulty occurs in understanding its nature. If from its situation the transparency cannot be examined, and if the fluctuation is not very distinct, a surgeon should be very cautious in operating on such a tumour.

The following case occurred to me.

Case.

I was desired to see a boy, a patient of Mr. Clarke, surgeon in the Borough, who had a tumour which extended from the upper part of the scrotum through the abdominal ring along the cord to the abdomen. The lad's father was anxious for the removal of the disease, but on examination it did not project sufficiently to enable me to judge whether there was either fluctuation or transparency. However, as it interfered with the boy's usual occupation, I resolved to cut down upon it with extreme caution. When I had reached by incision the surface of the cyst, I found the spermatic vessels running upon it, and was obliged to open the cyst by its side to avoid these vessels. The cyst contained a portion of the small intestine, every where adhering to its inner surface, which had prevented the return of the bowel into the abdomen. The vas deferens could be discerned behind the sac; so that this was a hernia, the sac of which had insinuated itself between the spermatic blood vessels and the vas deferens.

Enlarged testis.

Nothing but great want of attention can cause a hernia to be confounded with an enlargement of the testis. This latter is sufficiently distinguishable, not only by the absence of the symptoms characterizing hernia, but also by certain positive marks, by the form of the gland, which is retained under morbid enlargement, by its weight, by the pain with which it is generally accompanied, and by that peculiar and intolerable sensation always produced by pressure upon this part.

Hæmatocele.

Hæmatocele, or a collection of blood in the tunica vaginalis testis, is of the same form with hernia, and liable to be confounded with it. But the firmness of hæmatocele, the redness of the skin with which it is accompanied, its refusing to dilate under coughing, and a freedom from swelling of the spermatic cord at the abdominal ring, which is generally the case, will usually afford the means of distinction from hernia.

Varicocele.

But of all the diseases which are mistaken for hernia, none is so much so as the varicocele or enlargement of the spermatic veins. Often have I known persons (even the children of medical men) wear trusses for a supposed hernia, which they complained did not fit, gave them pain, and could not prevent the descent of the tumour, when upon examination I have found that the disease was this enlargement of the spermatic veins.

Varicocele has indeed many of the characters of hernia. When large, it dilates upon coughing, but not otherwise; it appears in the erect position and retires when the body is recumbent; and it is first observed near the external ring. The only sure method of distinction with which I am acquainted is this: place the patient in the horizontal posture, and empty the swelling by pressure upon the scrotum; then putting the fingers firmly upon the upper part of the abdominal ring, desire the patient to rise; if it be hernia, the tumour cannot reappear as

long as the pressure is continued at the external ring; but if it be varicocele, the swelling slowly returns with increased size, owing to the return of blood into the abdomen being prevented by the pressure. The diagnosis will also be materially assisted by the peculiar ropy feel of a varicocele, which gives the idea of a bundle of cords being attached to the outer part of the testicle.

There are, however, some cases of a complicated nature which demand much judgment and accurate discrimination. For instance, hernia is sometimes complicated with hydrocele of the tunica vaginalis; and sometimes the sac contains omentum, adhering to its upper part, and a collection of water below. If the adhesion of the omentum is complete, there is no danger of attempting the cure of the hydrocele by injection; however, if the case clearly appears to be of this kind before operation, it is best to use the method of incision.

Complicated cases.

The late Mr. H. Cline met with the following case of this kind at Saint Thomas's Hospital.

John Ruby, a sailor aged thirty, was admitted in Saint Thomas's Hospital, on Tuesday, January 3rd, 1815, for a scrotal hernia, which he had not been able to reduce since the Friday preceding. He gave the following account of himself. When he was about nine years old he had a cold accompanied with a violent cough, and while in the act of reaching down the hatchway of a vessel, he was seized with a fit of coughing that brought on symptoms of hernia, for which by the advice of a surgeon he wore a truss some years; but finding some inconvenience from it, he applied to a man who advised him to leave it off entirely (if he were not cured of the rupture) by the time he was twenty years old, which he did, and found no remarkable inconvenience from it till the Friday preceding his admission to the hospital; he then found that he could not reduce it as he had always done before when in a horizontal posture. The patient complained of hiccough, and could not bear the slightest pressure upon the abdomen; pulse 150. The usual means for reducing strangulated hernia having failed, recourse was had to the operation, which was performed by Mr. H. Cline. On making an incision into that which was supposed to be the hernial sac, a fluid similar to that of hydrocele escaped, which it afterwards proved to be, for it was the tunica vaginalis which had been opened; on dilating this opening a little, a tumour presented itself which was afterwards found to be from 1-8th to 1-4th of an inch thick, which being dissected through, a fluid, resembling the first in colour, but of a fetid smell, came out. This tumour was found to be the tunica vaginalis of the cord, but much altered from the natural appearance of tunica vaginalis by a quantity of thick lymph that had been effused, which gave it the appearance of India rubber: the intestine had adhered firmly to the adjacent parts, and the stricture was divided with the finger. Mr. Cline thought it not advisable to attempt to break through the adhesions, so as to return the intestine, lest it might bring on a dangerous degree of inflammation. The wound was superficially dressed, and the patient put to bed; he complained of some pain in the abdomen, for which he was ordered a fomentation. He soon became convalescent, and left the Hospital quite recovered, wearing a bag truss to support the scrotum.

Hydrocele.

Sometimes the case is still more complicated. A man of the name of Freeman, late a patient in Guy's Hospital, had a diseased testis and hydrocele on each side, the latter of which was open to the abdomen; together with a large hernia on the left side, and a smaller one on the right.

I have met with two instances of steatomatous tumours being mistaken for hernia. One of the cases was a boy brought to me for advice respecting it; the other was a man of about sixty years of age, whom I examined after death, and who had worn a truss for some years, by the direction of his medical attendant, under the idea of his having an omental hernia. The tumour was soft and felt like loose omentum, and was situated over the abdominal ring, exactly in the situation of an inguinal rupture. *Vide Plate 13.*

Steatoma.

CHAPTER IV.

Of the Causes of Hernia.

ALL the causes of hernia usually alleged may be resolved into two kinds: those which diminish the resistance of the abdominal muscles, and those which increase the pressure of the viscera.

The cause most generally predisposing to this disease is debility; by occasioning relaxation of fibre, it produces a dilatation of the apertures through which the spermatic vessels pass, and thus affords a passage for the protrusion of the viscera. The same cause also operates in elongating the attachments of the viscera, rendering them thereby more extensively mobile, and consequently more liable to be displaced from their natural situation.

If a person debilitated by fever returns to a habit of violent exertion before his strength is fully reestablished, a swelling of the groin will often occur, which proves to be a hernia. A gentleman, aged twenty-four, requested

my advice regarding a hernia that appeared after a fever without any cause that he could assign ; and an incipient one might be perceived on the left side.

Old age also, from the general relaxation which it produces, is so frequently attended with this complaint, that I have been surprised to find but few old men entirely exempt from it. Since I have had this publication in view, I have neglected no opportunity of procuring specimens of this disease, and on inspecting the bodies of old people I have scarcely ever been disappointed in finding either inguinal or femoral hernia. The subjects which I have examined, however, have principally been old persons who have been obliged to labour for their subsistence after their strength became unequal to great exertions.

Those who work hard, and live more on fluid than solid food, are also very subject to hernia ; whence its frequency among the poor of this town, who work to the utmost of their strength, and subsist very much upon liquids.*

Heat of climate and seasons, warmth of clothing during the day, and warm covering at night, must also be reckoned as predisposing causes of this disease. Herniæ, though frequent in England, are much less common here than in the south of Europe, or in Africa. A gentleman thus writes from Malta : “ This is the place where “ hernia should be studied ; for from the extreme relaxing heat of the climate, assisted by the constant exertions “ which the inhabitants are obliged to make in passing their rocky paths, few persons escape the disease, and it is “ often of an enormous size.”

In Egypt too we have the testimony of medical men who attended the late expedition, that herniæ are extremely common there, and often of an unwieldy bulk. Of this, Sir Robert Wilson mentions the following instance. “ I saw a man who had a belly hanging down from his navel to his ancles ; a blue skin contained his “ bowels, but which seemed so thin, as to be liable every moment to burst. The weight was enormous, and the “ size appeared much larger than an ox’s paunch. The unfortunate wretch was otherwise in good health, and “ crawled about gaining his bread by begging.”†

There are also other causes which diminish the resistance of the muscles and their tendons. Thus a person naturally fat, who has become suddenly lean, is in consequence generally the subject of hernia ; for the fat which had loaded the spermatic cord, and had extended the apertures to and from the abdomen, being suddenly absorbed, room is left for the viscera to supply its place. In some respect it appears to depend on hereditary conformation of the parts of the groin ; for I have frequently been consulted by fathers, themselves wearing trusses, for more than one of their sons afflicted with the same complaint. A gentleman applied to me with his two sons, all labouring under the disease. The father had a right inguinal hernia, the eldest son an umbilical, and the youngest a ventral hernia, between the ensiform cartilage and umbilicus, from a deficiency in the linea alba. Dr. S. his grandfather, and great grandfather, had an inguinal hernia brought on by the same cause—violent efforts while out shooting. In such cases as these, I have found by attentive examination the abdominal ring very imperfectly formed ; so that instead of the ring extending an inch in length, it could be traced nearly half way to the ilium. Hence it would seem, that in these persons the tendon which strengthens the superior angle of the ring, either does not exist at all, or is at least very imperfect ; for whoever is in the frequent habit of dissecting the abdominal ring will find it varying both in extent and in the firmness with which it is closed, being in some subjects carefully shut by the transverse tendon from the ilium, while in others this tendon is very small, or even entirely wanting. In such persons the slightest cause is sufficient to produce hernia.

Blows.

Hernia is often suddenly produced by blows. A gentleman consulted me concerning a tumour which had appeared in his groin after he had been thrown from his horse in hunting. He fell upon the post of a gate which struck against his groin, and he immediately felt great pain, and found a swelling in the part, which proved to be a hernia. A young gentleman from America, who had a hernia, told me that it appeared immediately after having received a kick from his schoolmaster. Neither of these, however, was oblique inguinal hernia, but a

* The proportion of ruptured persons in the metropolis may be judged of by the report published by the London Truss Society. An account of the ruptured persons relieved in seven years was published by the committee, by which it appeared that out of 7910 cases 6523 were males, and 1387 females ; and in this number the proportion of men labouring under inguinal hernia was 4036, while only 34 women were afflicted with this form of the complaint.—Ed.

† The labouring class of Asiatics most frequently met with in this country, and known under the name of Lascars, are by no means subject to hernia ; this I had attributed to the small size of the bones of the pelvis, which allowed less opportunity for the escape of a viscus. Mr. Hyslop, who has had great opportunity of acquainting himself with the diseases of these persons, has favoured me with the following communication. “ During six years I have been surgeon to the Asiatic seamen of the Honourable East India Company ; and I have not found that hernia is a frequent occurrence. These men are very temperate, both from religion and necessity : a Lascar never exerts himself to the utmost of his strength ; his nature is too indolent to be roused to any great effort. These people sit in a position that brings the muscles which pass from the inside of the loins to the top of the thigh in great and constant action ; so that these muscles must be full, hard, and unyielding, thereby filling up the space under Poupart’s ligament, and the internal ring through which the spermatic cord passes.”—Ed.

variety that will be hereafter described, produced, I believe, by a laceration of the tendon of the internal oblique and transversalis muscles.

Violent actions of the abdominal muscles, by the pressure which they exert upon the viscera, become frequent causes of hernia. It is in this way that coughing produces this disease. Children have occasionally been brought to me with this disease appearing during whooping-cough. Few persons who have long been asthmatical are free from it, and those who play upon wind instruments are more subject to it than others. Coughing.

But of all the causes of hernia the most frequent is lifting heavy weights, an action which strongly exerts the abdominal muscles at the time that the body is bent. In this position the lower part of the abdomen is not contracted to the same degree as the upper, the viscera are forced downwards by inspiration, and compressed by the abdominal muscles above, whilst the openings of the groin are relaxed by the posture of the body. I am informed that few persons are more subject to hernia than the men who work in our dockyards: the great weights which they are in the habit of lifting, and the stooping positions in which they often work, will, I think, sufficiently account for this circumstance. Lifting weights.

Persons who suffer under habitual costiveness, are not only subject to hernia, but have the symptoms of strangulation often brought on whilst at stool, owing to the strong pressure made on the abdominal muscles during the difficult expulsion of faeces. Hence it is right to caution persons subject to hernia to avoid every cause of constipation. Costiveness.

Strictures in the urethra appear to be a very frequent cause of this disease, as the difficulty in passing urine necessarily calls for more powerful action of the abdominal muscles. In the body of a man who had a stone in the urethra, which I opened with Mr. Weston, surgeon in Shoreditch, we found several hernial sacs. A man was lately in the accident ward of Guy's Hospital, who had an inguinal hernia appear soon after he began to labour under disury from enlarged prostate gland.* Difficulties in voiding the urine.

There are causes of this disease that principally affect the viscera, and in which the abdominal muscles may be said to be nearly passive. Thus the viscera become too large for the cavity of the belly in an extreme degree of obesity, which loads the omentum and mesentery with fat, and they are compelled to protrude through any opening that presents itself. If the fatness comes on very rapidly, it seldom fails to produce this disease, as the abdominal muscles cannot immediately accommodate themselves to the enlargement of the belly. Obesity.

The following case, sent me by Dr. Powel, of Northiam in Sussex, is an instance of an elongated mesocolon causing a descent of the gut; and as it is interesting in other points, I insert it at length:

J. Bridgland, aged about forty-five, corpulent, of short neck and stature, originally strong and healthy, but for several years past addicted to excessive drinking, on the 2nd of January, 1812, had a slight fit of apoplexy, for which he was bled, purged, etc., and was pretty well recovered. About eighteen months ago he brought on a hernia of the left side, in assisting to lift a barrel of liquor: it was easily reduced, and he constantly wore a truss. On the afternoon of the 4th of February the hernia descended, and instead of instantly attending to it he rode home on horseback about three miles. On his return he tried to reduce it, but ineffectually. About midnight I was called. The hernia had descended to the bottom of the scrotum, was found hard and inelastic; all my attempts to return it were abortive. The taxis was not painful; he complained of very little uneasiness, sickness, pain of stomach or back. Two copious bleedings in the erect posture, *ad deliquium*, purgatives of salts and calomel, strong opiates, warm bath, cold topical applications, tobacco clysters, etc., were to no purpose. The last remedy I had lately found very speedily successful in a very threatening case in the neighbourhood; but indeed in the present instance they were not retained a minute, as there was instantly an irresistible desire to void them. From the feel and appearance of the tumour, I at first hoped that the hernia had been merely omental; but as the symptoms increased, and he had no evacuation, it became pretty evident that the gut was included; yet, after thirty-six hours, the symptoms were still mild. There were some retching and a little vomiting, no hiccough, little pain or tension of abdomen, little heat of skin or quickness of pulse, and he occasionally got some sleep. However, as all probable means had been employed, I now wished to perform the operation, but yielded to the advice and opinion of a gentleman many years older than myself. The following morning we found our patient much worse; the pulse quicker, the thirst increased, great tension, though without much tenderness of abdomen, constant sickness and frequent vomiting, and in the last vomiting he threw up a small quantity of coffee-coloured fluid. The operation was now resolved on and performed. In dividing the integuments and fascia nothing occurred to delay, but the division of a small artery of the scrotum, which was secured by ligature. The whole of the hernial sac being now in view, a small opening was made near the lower part; a portion of fat instantly protruded, which I then supposed to be omentum, but on continuing the division of the sac to within half an inch of the ring, the colon presented itself at the superior and anterior part, much distended and highly inflamed, and was every where covered with a bag formed by the mesocolon, except at the open space left between the ring and the margin of the bag. The mesocolon, therefore, had descended before the colon, and the superior and convex surface, with the two longitudinal bands, were placed in the opening between the crescentic margin of the bag and opening through the tendon to the cavity of the abdomen. As I could with some difficulty Case.

* I have the notes of a variety of cases of stricture, brought into Guy's Hospital, accompanied with inguinal hernia; and it is by no means uncommon to find this complaint in persons who have been afflicted with calculus in the bladder at a late period of life: their abdominal muscles being called upon to act with increased force, at a period when the resistance of their parietes is weakened by age.—Ed.

introduce the point of the finger through the stricture, I endeavoured, though ineffectually, to empty the distended intestine. I now introduced the blunt-pointed knife between the sac and the tendon, and cut through the stricture. The intestine being now relieved from the pressure, I found that the whole posterior part of the protruded mesocolon adhered to the hernial sac so firmly as to form in appearance one body. On examination I discovered also, that the adhesion was continued within the abdomen, beyond the reach of my finger; it extended full four inches below the ring, and the whole breadth of the sac, and from the external to the internal margin of the opening in the tendon. I now endeavoured to return the intestine alone, but its connection with the mesocolon made it impracticable. What was now to be done? In parts so firmly coalesced, I could not attempt to separate the mesocolon from the sac; as I should, at every touch of the knife, have been in imminent danger of wounding either the intestine or the spermatic cord, or both; and as the adhesions were continued within the abdomen, the attempt would have been abortive. I resolved, therefore, if possible, to return the sac with its contents into the abdomen; but for this purpose it was necessary to enlarge the opening, after which it was with some difficulty effected. At this moment the patient was seized with copious vomiting of dark-coloured flocculous fluid, so common and so alarming a symptom in diseases of the intestines. The parts were again forced down, but were immediately returned. The wound was then dressed, and the patient put to bed. The return of vomiting soon produced the same effect, though an assistant constantly applied his hand firmly to the part, and it was impossible to prevent it. It was soon obvious that nothing was to be hoped for; the vomiting returned every few minutes,—he soon became insensible, and outrageous for his favourite liquor, gin; he frequently passed wind per anum, and had a small fetid stool; he sunk gradually, and died about forty-eight hours after the operation. On dissection, I found that the protruded intestine was about eight inches of the sigmoid flexure of the colon, with its mesocolon and two appendices epiploicæ, each about four inches in length, and as thick as the last joint of my thumb at their extremities. I had no time to dissect, but with a good deal of force separated the hernia from its sac, and found it adhering to the peritoneum within the abdomen about four inches. The intestines contained no great quantity of fæces, but were exceedingly distended with air. The small intestines were highly inflamed, and near the extremity the ilium was of a very dark colour. The whole of the colon was greatly inflamed, at places approaching to sphacelus, especially in the part included in the hernia, though still retaining some firmness of texture, and not yielding to the pressure of the fingers. The omentum was also inflamed, and by the distension of the intestines pushed up quite into the epigastrium.

I know not whether there is any thing curious in this case; if there be, it is perhaps the manner in which the mesocolon descended before the intestine, and its adhesion within the cavity of the abdomen. Independent of the condition of the parts, the operation was certainly too long delayed. From the firm adhesion it seems probable that the hernia had never been completely reduced, but that the mesocolon had always remained down from the beginning. If the state of the parts contained in the hernia had been previously known, I presume that the operation most likely to succeed would have been to dilate the ring, and return the sac with its contents unopened.

External pressure.

The same effect is produced by constant external pressure which tends to diminish the cavity of the abdomen, the size of its contents remaining the same. It is thus that hernia is brought on by wearing the breeches very tight about the waist, which pinch up the belly, and do not leave sufficient room for the variations that occur in the size of the viscera after taking food, or from exertions of different kinds. Mechanics who are in the habit of using the implements of their trade against their abdomen, bring on the complaint by pressing the viscera to the inguinal regions.

Pregnancy.

The enlargement of the uterus in pregnancy sometimes occasions hernia, but less frequently the inguinal, than the other species. Distention of the stomach operates in a similar manner. A frequent and forcible pressure or shaking of the viscera downwards, as happens in riding in rough carriages, is a common cause of this complaint.

Rough horses or carriages.

In the town of Yarmouth, where I formerly lived, I knew many persons who had this disease brought on by riding in the small carts peculiar to this town, and which from being constructed without springs were rough and uneasy, and shook the rider in a very severe manner. Coachmen who are much upon the box, and persons who ride rough-going horses, are for the same reason liable to this complaint. The cavalry are much more subject to it than the infantry; and I have known children in whom it has been produced by frequent riding in company with older persons, and constantly going a pace uneasy to them.

Jumping.

Jumping operates in the same way, often suddenly. I have known many persons, after much of this exercise, complain of a pain in the groin, which was soon followed by hernia. In these, and every other cause of the complaint, an upright posture of the body strongly contributes to its formation by keeping up the pressure of the viscera on the lower part of the abdomen.

CHAPTER V.

Of the Reducible Inguinal Hernia, and Use of Trusses.

HERNIAE are found in the three following conditions: reducible, irreducible, and strangulated.

The reducible is that state in which the protruded parts may be returned into the cavity of the abdomen; and as it is attended with no immediate danger to the patient, frequently induces in his mind a false idea of security. A person under these circumstances lives in continual danger, as numerous accidental causes may produce strangulation of the prolapsed intestine, the consequence of which will be fatal, unless early and well-directed skill be employed. Reducible.

To prevent this accident a constant pressure should be applied at the part where the hernia opens into the abdomen, to close the mouth of the sac, and thus oppose an effectual resistance to the protrusion of its contents.

For this purpose bandages of different kinds, and elastic trusses, have been invented; but generally the instrument that can be most safely relied on is a truss of steel; other bandages often afford only a false security, more dangerous even than a total omission of this kind of support, since they encourage the patient to take violent exercise without apprehension of the probable consequences. An elastic steel truss, if properly made and well applied, ensures the security of the patient during any degree of moderate exercise, and is no hinderance to any of the common occupations of life. Truss.

The pad of a steel truss is composed of a supporting piece of iron, and stuffed so as to take a form on the one hand not too conical, and on the other not too flat; the former occasions pain by an unnecessary degree of pressure, while the latter does not effect the purpose of preventing protrusion. The pad is rivetted upon a long flat piece of steel, tempered to a great degree of elasticity, and curved to the shape of the lower part of the body, which it embraces like a belt. The length of this steel should be sufficient to pass from the hernia round the region of the groin to about an inch beyond the spine behind, forming somewhat more than a semicircle, but compressed. Both the pad and truss are quilted with leather. A strap of leather proceeds from the hinder end of the truss, which passes round the opposite side of the body, completing the circular belt by fastening upon the pad. Its construction.

An under strap is sometimes added, which passes down from the back part of the truss between the patient's thighs, and is brought up to the fore part of the pad, to which it is fastened by a stud; this prevents the truss slipping upward. However, if the pelvis is well formed, that is, standing outwards, or the abdomen is large, this under strap is not necessary; but when the pelvis inclines towards the abdomen, the truss will slip from its proper position, unless retained by this strap.

Many surgeons, and almost every surgeon's instrument maker, have thought proper to vary the form of the truss, and to prescribe different rules for the direction and force of the pressure, but almost all were formerly agreed in determining that the pressure should be made upon the external abdominal ring.

This is precisely the circumstance, however, in which they were all defective; and indeed it is the frequent failure of the purpose for which they are designed, when made according to this principle, that has led to such variety in the mode of their construction. The object in applying a truss is to close the mouth of the hernial sac, and destroy its communication with the abdomen; and this object can never be perfectly fulfilled by any truss which is applied upon the external abdominal ring, and extending from it upon the os pubis. In this case the cure must be incomplete, because a considerable portion of the hernial sac remains uncompressed towards the abdomen, which portion is that situated between the abdominal ring and the opening of the sac into the cavity of the belly. In plate 5th will be seen a hernial sac closed opposite to the abdominal ring, but still open to the abdomen above and outwards. In the same plate, is another sac imperfectly closed from the same cause. This sac has several partitions in it dividing it into cells, the formation of which is to be explained in the following manner: The patient first applies his truss to the abdominal ring, which, after being worn for a time, shuts or contracts the sac at this part, and the patient thinking himself cured, leaves off the bandage. The sac, however, being still open higher up towards the abdomen, though closed at the external ring, the hernia again protrudes, and the truss is resumed; but being still applied upon the external ring, only a partial cure is a second time produced, and the cause of the disease remains as before. Nor is this all the mischief that attends this practice; for the pressure of the spermatic cord by the truss against the os pubis, frequently occasions great pain, Its application.

Sac imperfectly closed.

Septa in the sac.

to relieve which the patient is constantly shifting its situation, and destroying its effect, and often the testes themselves become wasted by the interruption of the passage of the blood along the spermatic vessels.

The proper method of completely obliterating the mouth of the hernial sac is to apply the truss, not only on the external abdominal ring, but also on the aperture at which the spermatic cord, and with it the hernia, first quit the abdomen; for the descent of a hernia cannot be entirely prevented, or a cure be effected, but by making pressure on the internal abdominal aperture, and on the inguinal canal.

Effect of the truss.

The effect of wearing a truss on this part is to approximate the sides of the mouth of the sac, and thus to prevent any future descent into the same cavity; if the pressure be long continued, adhesion takes place at the orifice of the sac, and interrupts the communication between the abdomen and the cavity of the sac, which being no longer distended by the descent of any viscus, contracts in dimensions, and at length in some cases becomes entirely obliterated.*

In plate 6th is shewn the mode of applying the truss so as to ensure the most favourable effect, the pressure being here exerted on the whole length of the inguinal canal. Therefore, when a hernia has been returned by the surgeon into the abdomen, he should lay his fingers obliquely above and to the iliac side of the ring, and direct his patient to cough; and the furthest part from the ring towards the spine of the ilium, where the hernial sac is felt to protrude, is the point which should be noted for the application of the pad of the truss, and the instrument made accordingly.

Mode of measuring for the truss.

Measurement is taken for making the truss by laying one end of a piece of string upon this spot, and carrying the other round the pelvis, midway between the trochanter major and spine of the ilium, till it meets the fixed point at first determined, and completes the circle. This is the proper length for the truss. In the above manner I have been in the habit of measuring persons for trusses, excepting when the hips have projected unusually, when it is advisable to substitute for the string a piece of iron wire, which, by retaining the precise outline of the patient's hip, serves as a necessary direction for the instrument maker to copy.

Different application in large hernia.

It will be found that the pad of the truss must be applied proportionally nearer to the abdominal ring in large than in small hernia. When the protrusion is small, the pad may be fixed midway between the symphysis pubis and the spine of the ilium; but as the dimensions of the hernia increase, the mouth of the sac moves gradually nearer the abdominal ring, and the artificial pressure must, in some degree, be regulated accordingly; always remembering, however, that the truss should never be brought upon the pubis, as a pressure on the outer and upper part of the ring will still be sufficient to keep the viscera within the abdomen.

Double truss.

It happens not unfrequently that hernia appears on both sides of the body. When this takes place a double truss, or one with two pads and springs must be worn, made of materials similar to the single truss. To make them sit easy, and fit properly, they should buckle behind, and be made longer or shorter at pleasure. This is done by constructing them in such a manner that one spring will readily slide upon the other. The principle of application, and the degree of pressure required, are to be regulated as the single trusses.

As it is often an object of importance for the patient to use the bath whilst wearing a truss, I have directed the spring to be covered with oil-skin, for the patient should on no account remove it at the time he is making so considerable an exertion as that of swimming.

Truss occasions uneasiness at first.

A truss when first applied produces some uncomfortable feelings for about a week, after which they wear off, unless the force of pressure is unnecessarily great, in which case the spring must be weakened, as it frequently brings on inflammation of the testicle. On the contrary, if the hernia ever comes down whilst the truss is properly applied, a stronger spring must be provided. The best made truss will chafe at first, however well put on, but this inconvenience of a few days may be lessened by interposing a piece of linen between the pad and the skin, which generally puts a stop to the uneasy chafing.

Time it should be worn.

It is usual for the patient to inquire how long his truss must be worn. This is difficult to be determined. I have known a hernia completely cured by wearing a truss only nine months, and instances are not at all uncommon, of the truss being left off at the end of a year without any relapse of the complaint. But I would at all events advise it to be worn at least two years even by young persons, in whom alone the complaint is curable by this method. As to elderly persons, they must continue to wear it for the remainder of life, for in them there

* The well ascertained fact of small hernial sacs being readily returned into the abdomen, proves the propriety of applying trusses, while the cellular membrane connecting the cremaster and sac preserves that capability of distension, which after a long continuance of the sac in the scrotum it ceases to have. A small and recently formed hernia is cured by a different process from that required in the cure of a large and old sac; in the latter the gut can only be permanently prevented descending by adhesion taking place between the sides of the mouth of the sac; whereas, a small hernia is cured by giving firmness to the cellular texture surrounding the neck of the sac, and thus preventing the elongated peritoneum descending through the internal abdominal ring.—Ed.

is no probability of much change taking place in the mouth of the sac. I have never known them long omit its use without experiencing some relapse: during growth, parts will readily accommodate themselves to pressure, extending or diminishing according to circumstances, but in adults, and in the old, this process is much more tardy. The truss should be worn even during the night, lest any unexpected occasion should call the patient from bed unprepared for the sudden change of posture; for if the hernia once descends during the wearing of the truss, the cure must be considered as recommencing from that moment. A patient should be provided with two trusses, in order to guard against the effects of accident, which may render one useless; and he will also experience great comfort in changing his night-truss before he rises in the morning.

Worn at night.

A hernia will sometimes remain apparently cured for a considerable time, and return on some sudden exertion. This arises from the adhesions at the orifice of the sac being imperfect, and yielding to the pressure of the viscera. A gentleman, aged twenty-five, applied to me with a return of a left inguinal hernia, which had originally appeared at the age of seven years; he had worn a truss for it till within two years of its second descent, a period of sixteen years; and during the last two years had remained free from any descent of his rupture. A hernia that thus reappears is much more liable to incarceration than a recent hernia, on account of the thickening produced in the neck of the sac by the pressure of the truss, which also renders the replacement of the protruded intestine a work of greater difficulty.

Return of hernia.

There is one circumstance which will always render a prudent surgeon guarded in promising a complete cure of hernia from wearing a truss: it is that although the original sac may be completely shut at its mouth by adhesion or perfect contraction, it is possible that another sac may be formed contiguous to the first. An instance of this may be seen in plate 5th. In this case two hernial sacs are found side by side, one open and capable of containing the bowels when protruded, the other contracted so much as not to admit a goose's quill. In the latter, therefore, the disease was cured, but remained in the former. A similar instance of a second descent is seen in plate 9th, and another example of the same kind will be mentioned hereafter.

Another sac forms.

Steel trusses are equally applicable to infants as to the adult; indeed, less unequal pressure is made by them than by common inelastic bandages applied round the pelvis. The scrotum of an infant should be carefully examined, to ascertain whether the testicle has descended through the external ring, as the non-descent of the testicle forbids the application of a truss; the sac, in such cases, is formed by the elongation of the tunica vaginalis, and any pressure made upon it will necessarily prevent the testicle descending into the scrotum. The application of a truss should therefore be deferred until the testis has fairly descended below the external ring. The nature of this hernia will be described under the subject of hernia congenita.

Infants.

When a hernia has been cured by adhesion, as the peritoneum which forms the sac is a secreting membrane, an accumulation of water sometimes collects in it, forming a species of hydrocele, an instance of which is represented in plate 5th. The treatment of this disease should be similar to that of hydrocele from other causes.

Hydrocele of the sac.

During the application of a truss it is proper that every part of the protruded contents should be carefully returned, so that no compression be made on them; and if the patient should find that any part has again descended, he should place himself in a recumbent posture, take off the truss, push back the hernia with his hand, and again apply the truss. A person obliged to use a truss who allows of the descent of a portion of the hernia whilst this instrument is worn, is in greater danger of strangulation of the part than if he wore no truss at all. For when unprotected by this bandage he always feels his danger, and is ready to guard against it; but a bad truss gives the idea of security without ensuring its reality.

When it is clearly ascertained that adhesion of the neck of the sac is effected, the use of the truss may be discontinued; but as this will generally be a matter of uncertainty, great caution must be used before the truss is laid aside. At first the patient may discontinue it at night, taking care to replace it before he rises from bed; he may afterwards remove it, when he is not called upon to make any violent exertion; but before it is wholly laid aside the surgeon should make a particular examination of the abdominal rings, to ascertain if on coughing or other sudden action of the abdominal muscles any descent or tendency to protrusion exist at the internal ring. A description of the best constructed trusses is given with the plate.

CHAPTER VI.

Of the Irreducible Hernia.

Irreducible.

WHEN a hernia is incapable of being returned into the abdomen by outward pressure, it is termed irreducible.

Causes.

The following are the causes which induce this condition of the protruded parts.

First, When they are suffered to remain long down they increase so much in size as to be incapable of reduction.

Secondly, Membranous bands form across the sac, and thus entangling its contents, prevent their free motion.

Thirdly, The protruded parts become closely united by an adhesion to the sides of the sac, sufficiently firm to render them immoveable.*

Dangers.

By whatever cause a hernia becomes irreducible, the patient is rendered subject to many inconveniencies and dangers. The principal danger is of strangulation of the protruded parts; however, this is certainly less in the irreducible hernia than in one that descends only occasionally; for in the former, the sac is already nearly full, and cannot readily admit of any great increase of its contents. But the patient is liable to danger from other causes, as will be seen by the following cases.

Case.

A man was brought into Saint Thomas's Hospital who had fallen from a ladder, and his scrotum, in which was a large hernia, struck upon the edge of a piece of wood. After complaining of violent pain and tension in his abdomen, in four hours he died. On examining his body after death, a portion of the ilium which had formed a part of the hernia, was found ruptured.

Mr. Norris, surgeon in the Old Jewry, also shewed me preparations of a lacerated and a burst intestine, and has favoured me with the following account of each.

Case of lacerated intestine.

Case.

A middle aged man who had been many years afflicted with a scrotal hernia, and had not worn a truss, received on the neck of the tumour a very violent push from the pole of a coach. Within an hour after the accident I saw him. His countenance was that of a dying man; his pulse was quick and feeble; he vomited very frequently, and complained of extreme pain all over the abdomen. In the part which received the stroke there was not, externally, any wound, and it was comparatively without pain. The tumour was now larger than it had ever before been, but quite free from that tension that accompanies a strangulated intestine. I had no difficulty in returning the contents into the abdomen, from which, however, he obtained no relief; very soon after removing the pressure of my hand the tumour became as large as before. In consultation with an eminent physician, various purgatives were prescribed, and occasionally opium, to quiet the stomach and allay pain; but nothing that we could devise had the effect, during the three days that he survived, of either procuring a passage or in any degree alleviating his torture.

The examination of the body was commenced by opening the hernial tumour, the whole contents of which were now found to be blood: the sac did not appear to have sustained any injury. The abdomen contained at least three quarts of extravasated blood, which was found to have proceeded from a lacerated wound of the mesentery and intestine ileon. It seems probable, that between those parts and the hernial sac there had been adhesions which were separated by the accident. The intestine was torn from the mesentery to the extent of about five inches.

The following is the case of *burst* intestine.

Case.

In the night of February 23, 1802, — Serjeson, a young man of a spare habit, running at a quick pace, and turning the corner of a street, came suddenly and violently against a post. About the middle of the abdomen was the part that received the shock, from the effects of which the man soon appeared to have recovered; but after proceeding a little farther he felt great pain and became very faint, which obliged him to sit down on the steps of a door, from whence, after remaining there ten minutes, he was able with difficulty to crawl home, a distance of about two hundred yards. I saw him early the next morning, and received the foregoing account. There

* Some herniæ are irreducible in consequence of retaining their cellular connexions after they have left their natural cavity. The bladder, when protruding, is generally incapable of being completely returned. The editor has dissected two cases, in which the cæcum had descended, and had become firmly connected by its posterior surface to the cord; for the sac in such cases is not complete, being deficient at the posterior and outer part of the gut, where the natural cellular connexions exist. It is probable that strangulation is less liable to occur where this deficiency of the sac exists, as the mouth of the sac not being a complete circle does not exert that constriction on the intestine, which a common inguinal sac is found by dissection to be generally attended with. Scarpa adverts to the error into which some surgeons have fallen, when they describe the hernia of the cæcum and lower part of the ileum as being entirely destitute of peritoneal sac. Dessault and Chopart appear to have fallen into this mistake, when they give an account of a hernia in which they found the cæcum covered only by the integuments of the scrotum. It is, says Scarpa, by carrying the incision too much along the *outer* side of the hernial tumour that the operator fails to open the sac in this variety of hernia, and hence conceives that the intestine has descended without peritoneum. This observation of Scarpa is valuable to the surgeon, and if acted upon will prevent a considerable degree of embarrassment, and even danger, during the operation; for the operator, when he has arrived at the cellular covering of the intestine, would not scruple to divide it, and thus would only be made aware of his mistake by the discharge of the fecal contents of the gut. By making the incision more to the *inner* side of the tumour, this source of difficulty to the surgeon, and of hazard to the patient, may be avoided.—Ed.

was not the slightest appearance of injury on the part that had received the stroke, but in the course of the spermatic vessels on the left side and extending into the scrotum, there was ecchymosis with enlargement equal to that which a moderately sized hernia might be supposed to produce. He was very sick; he vomited frequently and with great straining; his pulse was quick and extremely feeble; his countenance was pale and expressive of the greatest anxiety; and he complained of acute pain all over his belly. The abdomen, however, was quite soft, and the contents of the tumour in the groin were easily returnable into the abdomen, but quickly came down again when pressure was removed. I repeated this so often, and so minutely examined the parts, as to be perfectly sure that the swelling was caused merely by an extravasated fluid.

The abdomen was fomented, and a solution of Epsom salt in mint water was ordered to be taken every fifteen minutes until a passage should be procured. In the course of the day he swallowed four ounces of the salt without effect; the same symptoms continued with the most torturing pain; and in the morning he died.

Having some years before seen a man, who in consequence of an accident had his intestine torn from the mesentery (in an old hernia), with a laceration of the gut itself, in whose case the symptoms were exactly similar to those of the present, I ventured to predict that we should find a wound in some part of Serjeson's intestines. Having obtained permission to examine the body, Dr. Yelloly and I met for that purpose the day after death.

The tumour was then larger than before, was discoloured, and contained air, clearly discoverable by the touch; and being opened was found to contain water, blood and air. On opening the abdomen, a fluid of the same kind, to the quantity of about a quart, was there effused. Not the least appearance of injury or disease was discoverable in any part of the contents of the abdomen, except an irregular aperture in the ilion, which readily admitted my finger, and through which every thing that descended from the stomach easily found its way into the general cavity.

Such accidents, it is to be feared, will be almost necessarily fatal; principally on account of the circular fibres of the intestines drawing, as in this case, the lips of the wound asunder.

Another danger incurred by irreducible hernia is that of ulceration. This may happen when any pointed body is swallowed, and follows the course of the food down the intestinal canal into the hernial sac; when arrived in this place, it has been known to make its way out by ulceration, leaving a passage for the fæces. Ulceration.

A boy, aged thirteen, was admitted into Saint Thomas's Hospital for an irreducible scrotal hernia, from which a quantity of fæculent matter was constantly discharging through a small hole in the scrotum. He remembered having accidentally swallowed a pin, and five weeks afterwards his hernia began to swell, and to become very painful. A poultice was applied, and an abscess formed, which soon after burst, and on looking at the orifice by which the matter had discharged, the point of a pin appeared projecting from it, which was easily extracted. A fistulous opening of the intestine remained, for which he was admitted into the hospital. Attempts were made to unite it by paring off the edges of the wound and encouraging adhesion, but without success.

An irreducible hernia sometimes becomes of a most enormous size when it has remained entirely unconfined, and it then produces various other inconveniences, of which the case of Mr. Gibbon, the celebrated historian, will furnish a striking example. Enormous size.

Mr. Gibbon had been for thirty years subject to a scrotal hernia on the left side, of which he made no complaint, and to which he applied no remedy to prevent its increase: but in the summer of 1793, finding it grew suddenly uneasy, he became alarmed, and consulted Sir Walter Farquhar and Mr. Cline. The tumour was then of uncommon size, reaching to his knees, and very large at its connexion with the abdomen. As some water was perceptible at the lower part of the tumour, it was tapped in the month of November, 1793, and a large quantity of water was drawn off. In a fortnight after it was again tapped, and three quarts of water were evacuated, without any very sensible diminution of the swelling. Six weeks afterwards, the skin over the tumour having inflamed, and shewn a disposition to ulcerate, the tapping was again repeated, January 13, 1794, when six quarts of water were discharged. Two evenings afterwards he began to complain of a pain in his stomach and soreness in the abdomen, and in the tumour on pressure. He passed the night restlessly, but the next morning when he rose he seemed in better health and spirits than usual. Soon after he became insensible, and expired about eleven o'clock.

Mr. Cline asked me to accompany him to inspect the body. We found the abdomen nearly emptied of all the moveable viscera, no omentum remaining within the cavity, and of the intestines only the duodenum and cæcum. Even the pylorus was drawn down so low as to lie upon the orifice of the hernial sac, into which all the omentum, and all the intestines, except those I have just mentioned, had descended. They were all uncommonly loaded with fat, and slightly inflamed. The hernial sac extended nearly as low as the knee, its orifice was so large as to admit my hand within it. Below the sac appeared a separate bag large enough to hold several quarts of water, which, by its containing the testicle, proved to be the tunica vaginalis testis.

Consequences such as these result from a neglect of proper bandages in hernia. A tumour of such magnitude as that above described, requires to be concealed by a peculiar dress. The penis is deeply sunken into it, so that the urine can only be carried off by trickling over the surface of the scrotum, which must keep it constantly excoriated. Scrotum diseased.

Besides these inconveniences, a very large hernia produces a disease of the scrotum itself; an abscess is formed, which is kept fistulous by the constant distention of parts, and can hardly ever be healed without confining the patient to his bed.

Cure by fasting. When the contents of hernia have become so large and incumbered with fat as to render the disease at that time irreducible, it has been recommended previous to any attempt at reduction, to make the patient undergo a course of extraordinary fasting, accompanied with cathartic medicines, and every means used to keep up a free perspiration. It is scarcely to be doubted that such a plan would, after a considerable time, be attended with ultimate success; but I have never met with any one who would submit to so severe a regimen, to free himself from a disease, which only gives a present inconvenience, and does not alarm the patient for the future event.*

Laced bag truss. A more easy, and equally effectual remedy, is to apply a bag truss to support the scrotum, and made to lace before. In this way a considerable pressure is steadily preserved upon the parts, which occasions a gradual absorption of the adipose matter of the protruded hernia; and thus, after some days confinement, the tumour becomes very much diminished, and at last may be returned.

Cold. In some cases the application of ice also occasionally procures the return of a hernia which appeared irreducible.

I was asked by a physician to examine a hernia which had come down about a fortnight before, and had ever since resisted all attempts at reduction, without being painful. I found it was an omental hernia, and I ordered ice to be kept upon the tumour for a considerable time. In twenty-four hours it was so much diminished, as to encourage a perseverance in the plan, and in four days the hernia was entirely removed.

Mr. G., a surgeon in the East India service, called on me to shew me an omental hernia on the right side, which, though not painful, gave him some anxiety, as it could not be returned, and he was apprehensive of its becoming strangulated at some future time. I ordered him to bed, and put him on the same plan as in the former case, which produced a very gradual diminution of the tumour, and at the end of five days its entire removal. It appeared to me, in both these cases, that the good effects attending the use of the ice, was owing to a consequent contraction of the scrotum, which thus performed the office of a strong and permanent compression on the tumour.

Irreducible from
membranous
bands.

Hernia sometimes becomes irreducible, as I have before stated, from the formation of membranous bands across the sac, which entangle the protruded parts. They are seen in plate 5th, but in the preparation the viscera are in part removed to afford a good view of these bands.

They appear to be produced in the following manner: during the reducible state of the hernia inflammation takes place, both in the contained parts and in the inner surface of the sac; but by using proper means, the protruded parts are reduced, and the sides of the sac collapse and adhere together. However, while the adhesions are still recent, a fresh descent takes place from the abdomen, and the hernial contents again disunite the surfaces of the sac every where, except at the points of union of these inflamed parts, the cementing lymph of which, instead of bursting asunder, elongates with the fresh pressure, and forms these membranous bands which are seen passing from one side of the sac to the other. Between these the intestine and omentum get entangled, a circumstance which adds so much to the difficulty of reduction, as to make it, in general, considered as impracticable; but unless the hernial contents themselves adhere, there appears no reason why the means already pointed out may not here also prove successful. After all there is scarcely a possibility of detecting by the feel this variety of the disease in the living subject.

For the following case of irreducible omental hernia, cured by a natural process, I am indebted to my friend, Mr. Cooke, of Brentford.

Case.

Mr. Crow, of Hanwell, had been subject for three years to a scrotal hernia, and which had proved irreducible for the last twelve months. On the morning of the 6th of August, 1810, without any assignable cause, he was suddenly attacked with acute pain and swelling in the inferior part of the hernial tumour, extending along the course of the spermatic cord to the loins, and accompanied with rigors and vomiting. At five o'clock in the afternoon of the same day I visited him, and found him with all the symptoms of incarcerated hernia. The left scrotum was highly inflamed, and extremely dense and tender; the tumour was pyriform. He was bled freely, and during the faintness occasioned by the loss of blood, a continued though unsuccessful attempt at reduction was made. As the nausea and rigors, which had attended the commencement of the complaint, had entirely subsided, and no urgent symptoms had supervened, I directed the tumour to be fomented, and a solution of the sulphate of potash to be given, till the bowels were relieved. In the course of the night several copious evacuations had been procured, whence I concluded that strangulation of intestine did not exist. I now became less anxious respecting the safety of my patient, and ordered the treatment to be continued on the seventh and eighth, carefully abstaining from any active measures. Little alteration of symptoms took place till the ninth, when the hernial tumour assumed marks of suppuration; it had become more painful, and had produced considerable constitutional derangement. Opium was exhibited in form of pills every six hours; the parts kept constantly fomented and poulticed; and the bowels daily evacuated. Under this

* Mr. Hey has succeeded in returning omental herniæ by this method.—p. 222. The time generally required he found to be five or six weeks; in one case he effected a return in one week. Arnaud has also tried the same plan, with success, in several herniæ.—ED.

treatment the disease seemed to proceed with less violence till the twelfth, when two purple-coloured points were observable on the anterior part of the tumour. A distinct fluctuation could now be felt in the inferior part of the hernial tumour, and apparently communicating with the purple-coloured spots before mentioned; the substance between these and the abdominal ring was inelastic, highly inflamed, and painful. From the twelfth to the sixteenth the tumour became irregular, and more prominent at the centre, and threatening ulceration of the scrotum, which, however, did not take place till the twentieth, when a thin membranous bag was protruded, and unaccompanied with discharge; this proved to be the hernial sac. On the twenty-fourth the hernial sac ulcerated, and allowed the escape of a pint of sanious fluid, in which shreds of omentum floated. On examining the cavity which contained the fluid, the finger was intercepted in every direction by strong membranous bands extending across the sac, more especially at the anterior part, between the purple-coloured spots, at which point the adhesions formed an imperfect septum, drawing down the intermediate space. After the evacuation of the fluid contents of the tumour the symptoms gradually subsided; the bulk of the scrotum was considerably diminished, and daily sloughing of omentum continued till the seventh of October. At this time the inflammation, pain, and discharge had ceased, and universal and apparently permanent adhesions were formed between the scrotal contents and the abdominal ring, completely excluding any further descent from the abdomen. Considering the disease as radically cured, the patient was allowed to return to his usual occupations, without the use of a truss, and has since enjoyed a perfect state of health.

They also become irreducible, though rarely, from a contraction in the sac, which I have seen take place in its middle, so as to produce an hour-glass appearance, and a portion of omentum has been confined below and above the contracted part.

Contraction of the sac.

The intestine and the sac are liable to inflammation from accidental causes, of which the following case is an instance.

Inflammation.

I was desired to see a patient of Mr. Ashton's, on account of a supposed irreducible and strangulated hernia on the right side. I found a hernial tumour inflamed on its surface, and accompanied by a hardness which could be traced along the sac into the abdomen. The man seemed very low, had a very small pulse, was troubled with eructations and hiccough; but he had both flatus and stools pass by the anus. Finding that I could not return the tumour I made an incision into it, and let out some water from a hydrocele; then extending the incision upward, I opened the hernial sac, from which issued about two ounces of pus. The intestine which was in the sac appeared covered with a coating of adhesive matter, but was not in a state of strangulation; but as the ring was narrow I dilated it a little, leaving the adherent intestine in the sac. On pressing the abdomen, matter in considerable quantity issued from the upper part of the sac. The integuments being brought together over the tumour, a poultice was applied on the wound. On the following day he felt much relieved, but the wound continuing to discharge copiously for twenty-nine hours, he gradually sunk from exhaustion, but without experiencing any inconvenience from the confined intestine.

Case.

Herniæ are irreducible from adhesion having taken place between the contents of the tumour and the sides of the sac; they are sometimes universal, but more commonly partial; they exist most frequently at the lower part of the sac, but sometimes at its mouth only, and must remain unreturned for the rest of life, unless it be expedient or necessary to undertake an operation. The cases in which such an operation may be proper and necessary will be mentioned in a future place. All that can be done in an irreducible intestinal rupture is, to apply a bag truss of the size of the tumour, which, by affording a constant pressure, will check the increase of the disease. But if the hernia be omental only, its increase and the subsequent descent of the intestine may safely be prevented by a spring truss. There is so much difficulty, however, in these instances in the living subject, in determining the precise nature of the hernia, and deciding whether or not some small convolution of intestine may be descended, that the spring truss should only be fixed after the most careful examination, the spring itself weak, and it should be entirely thrown aside if it produces any pain or interrupts the functions of the bowels.

From adhesion.

In old irreducible hernia the omentum often becomes diseased. I have seen it affected with schirrus, that is, not the schirrus which terminates in cancer, but forming a large and very firm tumour. A specimen of this form of the disease is preserved in the Museum of Saint Thomas's Hospital. Hydatids have been known to be produced in it, but I have never seen an instance of it.

Schirrous omentum.

When suppuration occurs, it produces an external abscess. An instance of this happened in a woman, who had an abscess in the omentum which had arisen from an old irreducible omental hernia.

CHAPTER VII.

Of Strangulated Hernia.

Symptoms.

THIS form of the disease consists, not only of an irreducible state of the intestine or omentum, but of such a compression of the blood-vessels as to excite inflammation, and totally to interrupt the passage of the fæces through the strangulated portion. The symptoms are, considerable pain in the tumour, and a sensation as if a cord were tied tight around the upper part of the abdomen, or sometimes only round the navel. To these succeed frequent eructations, and vomiting of the contents of the stomach; and presently, as an antiperistaltic motion is established through the intestine, bilious matter is brought up. Indeed, when the strangulation has happened in the colon,* I am certain that I have seen portions of feculent matter discharged by vomiting, a circumstance which is accounted for, when it is considered that the valve at the end of the ilium is often imperfect, and especially that an antiperistaltic motion will reverse the operation of this valve, as well as of the rest of the intestinal canal. I have seen this symptom so often, that I can entertain no doubt on the subject.

An obstinate constipation attends the vomiting, so that no stools can be obtained, except from the portion of intestine below the strangulation, by means of glysters. The pulse is quick, and at the beginning of the complaint, hard. If effectual relief be not obtained, the tumour becomes red and painful, and when handled, the mark of each finger is left in a white hollow impression, as occurs on pressure of a dropsical limb. This indicates an effusion of fluid into the cellular membrane covering the hernial sac, produced by the continuance of the inflammation. The abdomen now becomes slightly tense and sore upon pressure, the vomiting very frequent, and the whole body is bedewed with sweat. The constipation remains obstinate, and instead of eructation, hiccough comes on, whilst the countenance sinks and shews great anxiety, and the pulse now becomes extremely small and thready, so as to lead those unaccustomed to the disease to think the patient dying. These symptoms, however, are subject to exacerbations; they are for a time very violent, and described by the patient as spasmodic, after which the patient becomes comparatively easy, so that the surgeon is flattered with hopes that the means he has employed have been successful, till the symptoms again return with more than their former severity.

After having suffered acute pain throughout the first stage of the complaint, the patient becomes suddenly easy, and expresses great satisfaction at this change. The tumour, which still continues, generally assumes a purple or leaden colour, and gives a crackling feel, owing to air being contained in the cellular membrane. The abdomen becomes more tense, the hiccough more violent, a cold sweat covers the body, and the pulse, though now fuller and softer than before, if attended to for a little time, is found to be intermittent; but still the patient remains perfectly sensible, and generally continues full of hopes till death, which now speedily puts an end to the complaint. So remarkably strong is this delusive feeling of amendment, that I have known a patient at this extremity insist upon rising, and expire in the very act; and another who sat up in bed, called for something to drink, and died as he was putting it to his lips.†

Dissection.

If the tumour be examined after death, a quantity of clear serum will first be found under the skin. The

* It is a generally received opinion, that the contents of the intestines do not assume a decidedly feculent character until they have passed the valve of the colon, and are exposed to the action of the secretions of the large intestines. Such may perhaps be the case in the ordinary, healthy, and active peristaltic motion of the intestines; but under strangulation, when the passage of the contained matters is impeded, they become feculent even in the ilium, as I have had opportunities of observing in cases of artificial anus succeeding the operation, in which dissection has afterwards shewn the strictured portion to have been the lower part of the small intestine; to account, therefore, for stercoraceous vomiting, we need not have recourse to the retrograde passage of the contents of the large intestine through the valve of the coli; although the well-attested fact of clysters being vomited prove the possibility of the occurrence.—Ed.

† To account for the symptoms attendant upon a strangulated hernia, we may look to two conditions of the intestine, as arising from the mechanical injury its coats sustain from the stricture, and the derangement produced in the upper portion of gut, by the obstruction afforded to the passage of its fecal contents. I confess that I think with Mr. Travers, that the morbid phenomena are to be mainly attributed to the latter cause. This opinion receives strong confirmation from the identity of symptoms in cases of strangulation, and of simple fecal obstruction from other causes, as in the instance of ileus; from the inflammation being confined, in cases of strangulation, to that portion of the intestine between the stricture and the stomach; from the absence of morbid action and of diseased appearance in the portion of gut below the strictured part, although continuous with it. These circumstances, combined with the order in which the symptoms occur, satisfactorily explain the effect of a stricture upon the canal. Nor do I think this opinion weakened by objections that have been urged against it by a modern writer, who observes, that “the symptoms of strangulation frequently come on with a degree of severity which bear no proportion to any actual or possible accumulation;” for, as he observes in the next paragraph, “we may expect on this, as on other occasions, that the effect of the local irritation will vary according to the condition of the constitution, and of the intestinal functions, in different persons or in the same individual.”—Ed.

hernial sac contains a portion of bloody serum of a coffee colour. The intestine is of a chocolate brown, with here and there a black spot, which easily breaks down on being touched with the finger. A coat of coagulable lymph, of the same colour as the intestine, may be peeled from its surface, and adhesions of no great strength are found to extend from the intestine to the sac. At the particular part where the intestine is strangulated by the constricting membrane, it is either ulcerated through, or readily pulls asunder under slight pressure. If the inflammation has been very extensive there is a quantity of air in the surrounding cellular membrane.

The inflammation which takes place in strangulated hernia is different from almost every other species: in most cases it is produced by an unusual quantity of blood sent by the arteries of the part which become enlarged; but still the blood returns freely to the heart, and the colour of the inflamed part is that of arterial blood: whilst in hernia, the inflammation is caused by a stop being put to the return of the blood through the veins, which produces a great accumulation of this fluid, and a change of its colour from the arterial to the venous hue. This venous appearance which the intestine assumes ought to be distinctly understood, that it may not be mistaken for mortification, which shews itself either in an appearance of discoloured spots dispersed over the bowel, or in a more complete disorganization of texture, arising from entire loss of vitality, and a consequent putrefactive process. *See coloured Plate.*

Peculiarity of inflammation.

On dissection, three or four convolutions of intestine are found lying across the abdomen, so enormously distended as to exclude the other viscera from view, and agglutinated slightly together by an effusion of adhesive matter; the track of adhesion is marked by red lines, formed by the inflamed vessels which furnish the secretion. These distended convolutions consist of the portion of intestine immediately above the seat of stricture, and owe their state of extreme distention in part to a collection of feculent matter, but chiefly to a secretion of air into the cavity of the intestine. The portion of intestine below the stricture is, on the contrary, remarkably contracted in diameter, and free from any appearance of inflammation.

Appearance of the abdomen.

In strangulated omental hernia the symptoms are much less violent than in the intestinal species. The vomiting is not so frequent, the pain in the tumour but inconsiderable, the tension not so great over the abdomen, and the constipation is by no means so complete; for stools can, in general, be procured through the whole duration of the disease, both by glysters and by cathartics, until the peritoneal covering of the intestines participates in the inflammation. The hiccoughs are violent and constant from the dragging effect on the stomach, and the pulse, though small and frequent, is not so remarkably small and thready as in the intestinal hernia. In this species, inflammation occasionally takes place on the skin, though more rarely than in intestinal hernia; and when an extensive slough is thrown off, it is attended with much less constitutional irritation.

Omental hernia.

On examination after death from strangulated omental hernia, the omentum is found scarcely changed from its natural appearance, its colour is a little, and but little, darker than usual. I have found it in some cases, even during the operation, extremely offensive to the smell. There is scarcely any fluid in the sac. Though the cavity of the abdomen is inflamed, and the intestines slightly adhering to each other, they never appear to have suffered so much as from intestinal hernia.

On examining the seat of the strangulation in inguinal hernia, it will sometimes be found at the abdominal ring, which from its unyielding nature has operated like a tight cord upon the protruded omentum or intestine, when more of these abdominal viscera have passed down, than the aperture would readily admit or allow to return. This is the principal point of strangulation in old and large herniæ; but it is more commonly seated at the internal ring, at the place where the spermatic cord first quits the abdomen. The strangulating pressure is here made by the internal oblique and transversalis muscle and its tendon, which pass over the hernial sac in a semicircular direction, and by the fascia transversalis arising from Poupart's ligament, the semicircular border of which passes under the sac, and which has been mentioned in the anatomical description of these parts. In plate 11, fig. 4, is represented a preparation of a hernia thus strangulated by pressure above the ring. Hereby may be explained the opinion which some surgeons have entertained of the *spasmodic* nature of the stricture, a state which it was difficult to account for when the seat of strangulation was supposed to be confined to the external ring, as this tendinous aperture possesses no muscular action, and therefore cannot assume the state of spasm. But when the strangulation is at the upper ring, a portion of intestine protrudes under the edge of the internal oblique and transversalis muscles, compressing them, which in their turn being excited to contraction by the irritation of this pressure, react upon the intestine with a force sufficient to produce a strangulation, accompanied with spasmodic symptoms. If then the surgeon, during the operation for hernia, examines accurately into the seat of the strangulation, he will find that, except in large herniæ, cutting through the external ring is insufficient to release the protruded parts; but he must proceed with his knife obliquely outward before he can return the swelling. For the truth of this assertion I would

Seat of strangulation.

At the external ring.

At the internal ring.

Spasmodic structure.

appeal to those surgeons best acquainted with the structure of the parts, who have performed this operation the most frequently, and with the greatest attention.

Mouth of the sac thickened.

The mouth of the hernial sac, when it becomes the seat of stricture, has been thickened on the inner part by the pressure of the tendons of the internal oblique and transverse muscles; and if a truss has occasioned much pressure on its outer side, the whole circle of the sac becomes thickened in consequence: thus the cause of the stricture at the mouth of the sac is occasioned by parts external to the sac.

Moreover, though the abdominal ring be dilated with freedom, the hernia will in many cases still retain its colour of strangulation, and remain as irreducible as before; but if the sac be traced up with the knife about an inch and a half, obliquely outward, the stricture will there be found; and when this is divided the intestine can be readily returned.

Hernia sloughs.

Strangulated hernia is almost always fatal unless the tumour is reduced, but now and then an instance will occur of the parts sloughing off, and a fistulous opening remaining for life at the wound, through which the fæces are evacuated. This dreadful termination of the disease leaves the patient constantly offensive, incapable of considerable exertion, and renders life itself rather a loathsome burden than a prolonged enjoyment.

In young persons, where the powers of life and reparation are vigorous, a hernia will sometimes slough, and the aperture be closed by a natural process, as the following case, that occurred under Mr. Holman, surgeon of Wallington, and communicated to me by Mr. Kingdon, of Exeter, shews.

Case.

William Kelland, a lad aged sixteen, had an inguinal hernia on the right side, in May, 1803, and which, by the usual means, was fortunately reduced. He had not the least appearance of a return till the morning of November 25th, 1806. Whilst exerting himself and profusely sweating, he found a return of the hernia in the right scrotum, with most excruciating pain. He remained sitting on the cold damp earth for some time, very sick and faint, till he was carried home some distance, exposed to a very cold wind. I was then called for from a few miles distant, and finding not only the hernia itself, but the whole expanse of the abdomen very tender, did not think it prudent to hazard an attempt at reduction. The whole peritoneum was in a state of inflammation. Cold applications were immediately ordered, glysters exhibited, and the lancet had recourse to. The oleum ammoniatum also, with camphor, was rubbed into the abdomen, and a saline mixture with the vinum antimonii given, which afforded him some relief. But on the third day he was seized with sickness and frequent vomiting, with alternate rigors and heat; the pulse was full, and the hernia hard and extremely tender and painful. Blood was drawn from his arm, the medicine continued, and linseed made into a cataplasm with the *aq. lithargyri acetati* applied to the tumour. An anodyne draught also was occasionally repeated. The tumour now began to change its appearance, and, from the colour, indicated suppuration; whilst the unfavourable symptoms abated much in violence till December 8th, when on visiting him and removing the dressings, I found a small oozing of matter from the most prominent part, where an incipient sphacelus had taken place. I immediately opened it, had a copious discharge of pus and fæces, took off a small portion of sphacelated omentum which protruded, and dressed the orifice with dry lint, and over it a linseed poultice. The opiates and mild purgatives were continued as became necessary. In a few days the whole sac sloughed off, and every thing went on favourably. In about ten days from the first opening it, an adhesion of the parts was evidently commencing, and the fæces were, in part, voided per anum. From this time the extract colocynthidis compositum was given him at intervals, the ulcer dressed with a mild digestive ointment, and a tonic plan pursued till the end of January, 1807; when the opening was entirely closed, all appearance of the tumour vanished, and the fæces passed wholly by their natural course. He is at this time strong and healthy, capable of enduring great fatigue and exertion without any inconvenience.

Medical men liable to be deceived by the patient.

Whenever any medical attendant is called to a person suffering under the symptoms which I have described above, he should carefully inquire whether his patient has had no tumour coming down in the day, and returning when in the recumbent posture at night, in the groin or any other known seat of hernia; and he should not be content with mere inquiries, as persons are sometimes unconscious of this disease, and sometimes unwilling to acknowledge it, but he should himself carefully examine the abdomen with his hand, to discover, if possible, any tumour to which these symptoms may be attributed.

Strangulation from one convolution.

Though the cause of strangulation is the descent of an additional portion of intestine and omentum into the hernial sac, it might be thought that the mere protrusion of a greater length of a single fold of intestine would not increase the stricture at the narrow ring of compression; but the reason that it does so is, that a proportionally larger quantity of mesentery descends along with the bowel, and thus increases the pressure made by the stricture upon the blood-vessels of the hernial contents.

Causes of strangulation.

The same causes that produce herniæ render them strangulated; such as sudden distention of the abdominal viscera; exertion of the abdominal muscles, particularly in positions which compress the bowels on the upper part of the abdomen, and leave the lower part relaxed, and the apertures unguarded; violent exertions in expelling the fæces; raising a heavy weight from the ground when the body is stooping; straining to reach a great height; coughing; sneezing; and the like. Eating flatulent vegetable food is peculiarly apt to induce strangulation. This

latter cause operates by distending the intestinal canal, causing it to occupy more space than before in the abdomen, and consequently pushing out part of the viscera into the hernial sac.

A small hernia is more easily strangulated than a large one, the pressure on the contents being more violent, and the symptoms are much more urgent, as the stricture acts with more effect upon a single knuckle in stopping its circulation, than when the contents of a hernia are large and voluminous; and a hernia which appears suddenly is more liable to this accident than one of long standing, which has been in the habit of frequently coming down, the aperture which admits the descent of the latter being enlarged from repeated protrusion, while in the former it is proportionally contracted around the intestine.

Small and recent
hernia most readily
strangulated.

CHAPTER VIII.

Of the Treatment of Strangulated Hernia.

As all the symptoms which have been described in the preceding chapter originate from the compressed state of the protruded parts, it must be the surgeon's object to return them as soon as possible into the cavity of the abdomen; and he is only wasting time by any attempts to alleviate the violence of the symptoms, independent of this principal object.

Object to return
the parts.

The return of the part is first to be attempted by what is called the Taxis. This is done by making pressure with the hands upon the tumour, and at the same time placing the patient in that posture which gives as much room as possible in the abdomen, and relaxes its muscles and apertures.

Taxis.

The best position for this purpose is supine, with the body moderately incurvated. This is effected by laying the patient upon his back, and putting one pillow under the pelvis and another under the shoulders, which will cause the loins to sink between them. Both the thighs should also be elevated to a right angle with the patient's body, and the knees should be brought so close together as only to admit of the surgeon's arm between them: this last is a most essential point, since it relaxes the fascia of the thigh, and consequently the aperture through which the hernia first quits the abdomen, which, as we have before described, is ultimately connected with this fascia. The patient should also be desired to void his urine, and then to keep himself as quiet as possible.

Position of the pa-
tient.

The surgeon then places himself by the patient's right side, and, embracing the tumour with his right hand, he presses it towards the abdominal ring so as to keep it from receding: then applying the finger and thumb of his left hand upon the neck of the tumour at the part where it enters the abdomen, he gently presses it from side to side, thus endeavouring to disengage it, and to get a small portion of it within the abdomen. If any part can be forced up, the rest generally follows without difficulty. The pressure may sometimes be more effectually made, by having some counterforce to prevent the patient's body receding.

Of the surgeon.

Mr. Gaitskell sent for me to visit Captain Farrier, whose hernia had been strangulated for fourteen hours. The tobacco glyster and bleeding had been employed. Finding that while he was in bed the parts yielded without returning, I made him stand before me against the bed, with his knees bent, and making pressure on the tumour upward I easily returned its contents.

Case.

The pressure should be maintained from a quarter to half an hour. I have known it succeed after a trial of twenty minutes, and it should not therefore be hastily abandoned. The degree of force should be but moderate, as the chief dependance should be placed on continuance rather than violence of pressure, the latter being sometimes known to produce a laceration of the protruded parts. Of this the following case is an instance.

Pressure.

Degree of.

A woman of the name of Chilton, a patient in Guy's Hospital, had an irreducible hernia, for the reduction of which a very considerable force was improperly used, when it suddenly gave way, but the tumour did not entirely disappear. In a week afterwards the part became very red and painful, a poultice was applied, when it broke, and a large quantity of bile, or rather of the contents of the small intestines, was discharged. This continued for several days, and afterwards gradually diminished, and the wound healed up entirely. Probably an adhesion had taken place between the ruptured intestine and the mouth of the sac, so as to prevent the effusion of bile from the bowel into the cavity of the abdomen, which would have produced fatal consequences.

Case.

The longer the hernial tumour has been strangulated, the more dangerous is it to use any considerable pressure for its reduction, as the parts have then a much less power of resistance than in their natural state.

Slinging the patient.

The force of the pressure should be directed towards the anterior and superior spinous process of the ilium, in the course which the tumour takes obliquely upwards, and not towards the abdomen immediately behind the abdominal ring.

If the attempts at reduction in the posture which I have described do not prove successful, it has been recommended to sling the patient by his knees, with his head hanging downwards, over the shoulders of an assistant. This position, however, does not provide for that relaxation of the abdominal muscles which is so desirable, and it is altogether painful to the patient, and renders it difficult for the surgeon to apply proper pressure upon the tumour. From frequent experience of it by my own trials, and by witnessing those of others, I can affirm that I have never found it answer, where the other method, fairly and fully performed, has previously failed.

The sudden relaxation of the abdominal muscles during a fit of coughing, by taking off pressure from the viscera, together with the ascent of the diaphragm in the act of coughing, will sometimes assist in its reduction. A patient was brought into Guy's Hospital, who, during the attempt to reduce it by my dresser Mr. Workman, was seized with a violent fit of coughing; the pressure being continued during the paroxysm, he felt the hernia suddenly recede into the abdomen.

Case.

John Kemp, aged fifty-eight, was brought into Guy's Hospital, November 18, 1811, with a strangulated inguinal hernia on the left side. Two days before his admission the hernia had descended and could not be reduced, notwithstanding the repeated efforts of the surgeon in attendance. The Taxis was now employed by placing him on a bed, with a pillow under his shoulders, and his knees drawn up so as to relax his abdominal muscles; pressure being now made on the tumour upwards and outwards, the man was desired to cough, which he did, and immediately the intestine slipped up.

Intestinal most easy of reduction.

The intestinal hernia will be found more easy of reduction than the omental. The former goes up suddenly with a gurgling noise; the latter returns gradually, excepting the last remaining portion, which does indeed rapidly slip up from beneath the fingers, but unaccompanied with any noise. If from want of elasticity in the hernia the surgeon is clear that it is merely omental, the force used for reduction may be much greater than it would be safe to employ for the intestinal species.

Bleeding.

If a fair trial of the plan which I have just mentioned should not prove successful, other means should be resorted to. One of them is venesection, the object of which is, first, by the general languor which it occasions, to produce a relaxation of the strictured part, and next, to prevent the local inflammation from running so high as to occasion mortification, which would render the case fatal though the protruded parts were returned.

The quantity of blood to be drawn should be from fourteen to twenty ounces, according to the strength of the patient's constitution. So much should be taken away as to bring on a degree of faintness, in which state of general relaxation the attempts at reduction should be repeated. A surgeon unaccustomed to the small thready pulse of a person suffering under strangulated hernia, feels apprehensive of taking away blood, conceiving the patient's strength to be fast sinking; but this fear is groundless, as the pulse becomes larger and fuller after this evacuation.

Warm bath.

If this fail of success, the patient is usually put into the warm bath, and indeed I generally employ the warm bath immediately after the bleeding, before the second attempt at reduction by the Taxis. The first heat of the bath should be about one hundred degrees, and it should be gradually raised till the patient faints, or feels disposed to do so, which mostly takes place in fifteen or twenty minutes. The attempt at reduction is then to be repeated.

The depression produced by the strangulation of an intestine is sometimes so great, that very slight causes will induce a state of syncope, from which the patient is with difficulty roused. In the following case the syncope, brought on by the warm bath, proved fatal.

Case.

John Hughes, aged fifty-four, much addicted to spirits and very spare habit, was subject to a scrotal hernia on the right side for six years, caused by violent exertion in coughing. It had been strangulated once before, when, not being able to reduce it, he was sent to Guy's Hospital, where he was put in the warm bath, and in it the rupture was easily reduced. On the 26th of September, 1806, about twelve o'clock in the morning, he complained of considerable pain in the rupture, which had been down all night; he had slight sickness, but brought up only a little phlegm; pulse very small, scarcely to be felt, 120; no pain, either on pressing the tumour or abdomen; the surgeon endeavoured to reduce it for near an hour, but not effecting his purpose he desired him to go home and apply ice; should no effect be produced in two hours to send for him, which he did not till six o'clock in the evening. During this interval he had two copious stools: his abdomen now becoming tender to the touch, and as he was in a place where no necessities for a man in his situation could be procured, he sent him to Guy's, where he was put in the warm bath 96; he became easier and a little faint, when Mr. Seward easily reduced it. Just before his immersion he had that low muttering which frequently precedes death, but which subsided in the bath; he raised himself with considerable firmness out of the bath; pulse 84, not weak; but he had scarcely reached the chair, which was only

two yards distant, when he was seized with a fainting fit, and in less than three minutes he was dead. During the fit a large quantity of very offensive feculent matter was discharged from his mouth. So sensible was this man at the time of his coming out of the bath, that of his own accord he supported his scrotum to prevent the descent of the hernia.

Leave was obtained to open his body. In the chest all was natural; in the abdomen the liver was granulated, pale, as were all the intestines except about two inches, which was the portion in the sac, which was of a very dark purple, deeper in some places than in others, but no spot of mortification; there were two strictures, one at the upper the other at the lower opening, the former was most considerable; several fine bands of lymph were formed across the sac; a very considerable quantity of fluid in it, which was so acrid as to make the fingers smart, though the skin was not abraded.

To account for this man's death, it is probable that the severity of the syncope (caused by the relaxant powers of the warm bath in a constitution greatly debilitated, and at the same time under excessive irritation), was so great that no stimuli was sufficiently strong to rouse the heart again into action.

The patient scarcely ever fails to express feeling much less pain after the bleeding and the warm bath than before, at the same time that it too often happens that no advantage is gained in the essential point of reduction.

The two remedies on which, as far as my observation goes, a firmer reliance is to be placed, are the tobacco clyster, and the application of cold; and if these fail I should be little inclined to await the trial of any other remedy.

Tobacco has been used in hernia both in form of smoke and as a liquid clyster. To use the smoke with any effect requires a complicated apparatus, and consequently it is often very badly managed; it is besides uncertain in its effects, and hence its use has long been discontinued in the hospitals of the Borough, and in the private practice of their surgeons.

Tobacco clyster.

The tobacco clyster, which is by far the most convenient, is made by infusing a dram of tobacco in sixteen ounces of boiling water for ten minutes, after which it is fit for use. But as the effect of this potent remedy varies very much in different constitutions, and perhaps according to the quality of the tobacco, it is best to inject only half the quantity at first, and the remainder half an hour afterwards, if the first portion has not proved sufficient. To those who have commonly heard of two drams being thrown up at a time without bad consequences, this may appear an useless precaution; but, instructed by personal observation, I can venture to assert, that whoever practises this often will meet with effects which will lead him to repent his rashness.

Mode of administering.

I once saw a man with whom the tobacco clyster had been used in the quantity of two drams, without a reduction of the tumour, who about half an hour afterwards was put upon a table to have the operation for hernia performed; when his pulse was found so low, his countenance so depressed, and his body covered with cold sweats, that he was ordered back to bed, and on carrying him thither he expired.

A girl who laboured under strangulated hernia, and who was sent to Guy's Hospital by Mr. Turnbull, surgeon, had a single dram of the tobacco in infusion injected. It produced most violent pain of the abdomen, with vomiting, in which was thrown up a matter which smelt strongly of tobacco, and she died in thirty-five minutes after the clyster had been administered, and most evidently from its effects.

These are my reasons for advising the above cautious manner of using this remedy, but at the same time it should be observed, that there are some persons on whom even the quantity of two drams produces little effect.

When the tobacco acts in the manner to be desired, it produces extreme languor, a weak and quick pulse, a cold sweat, and such universal relaxation, that the patient has not power to exert any of the voluntary muscles of the body. In this state the hernia will often return into the abdomen with a very slight pressure, though it had previously resisted a considerable degree of force. I have felt a hernia, which had been previously tense, under the operation of a tobacco clyster become perfectly soft and relaxed, which state was produced not by any partial return of its contents, as no pressure had been used, but simply by the temporary removal of the force of circulation from the protruded intestine. In some cases I have observed that the warm bath has rendered the tumour more tense, and increased its volume; probably by increasing the heart's action, determining a larger quantity of arterial blood to the intestine than the compressed veins were able to return. It is from the opposite effect that the benefit of the tobacco enema is derived; it so depresses the force of the heart, that the pulse at the wrist can hardly be felt; and this temporary suspension of the force of circulation relieves the distended vessels of the gut, and, by diminishing its bulk, assists in its reduction.*

Its action.

The other powerful method of assisting the reduction of hernia is the application of cold. To produce it,

Cold.

* I have seen so much success attending the tobacco enema, that I have no hesitation in employing it, with the precaution of proportioning the quantity injected to the age and constitution of my patient. It is, I apprehend, to the neglect of this precaution in regulating the dose, that the objections to this powerful remedy are owing; nor should the robust and feeble, the young and old, be, as they generally are, indiscriminately subjected to the action of tobacco. Discrimination in administering it, and care in regulating the quantity, ought to be as much the objects of the practitioner, as in the employment of powerful remedies that are given by the mouth.—Ed.

brandy and vinegar, vinegar and sal ammoniac, or simply dashing cold water upon the naked abdomen and tumour, have all been employed. The most simple and effectual, however, where it can be procured, is to apply ice. For this purpose it should be broken in small pieces, and put into a bladder so as to half fill it, which being tied up and wiped dry is to be laid upon the hernia and to cover the inflamed and swollen parts. Its effect is almost immediately to diminish pain, to contract the skin over the tumour, and by the pressure thus produced to compel the return of the protruded parts. Another great advantage of this remedy is, that it arrests for a length of time the progress of the symptoms, so that it may be continued for several hours upon the part without incurring the risk of losing too much time. If after a trial of about four hours the symptoms become mitigated, and the tumour lessens, this remedy may be persevered in some time longer, but if they continue with unabated violence, and the tumour resists every attempt at reduction, no further trial of the ice should be made.

A case which occurred under the care of Mr. Johnson, surgeon, of Bexley, shews the good effect of the long continued application of ice in reducing an inguinal hernia.

Case. A boy from hard work had rendered a small inguinal hernia irreducible, but unattended with symptoms of strangulation. Ice was ordered to be applied on the Tuesday, and he was desired to keep the recumbent posture. By the continued application of the ice, on Thursday the hernia had become smaller, and was reduced with the greatest ease.

The following case illustrates more strongly the utility of ice, as an application to an incarcerated hernia.

Case. William Bennett, aged forty-three, was admitted into Guy's Hospital with an inguinal hernia on the right side, which became strangulated at eight o'clock on the evening of Tuesday, April 11th. He said that it had first appeared five or six years ago in consequence of lifting a heavy weight, but he could always return it to the present time. He immediately felt a pain shooting from the right groin across to the left and to the scrobiculus cordis; he became sick, and vomited all night till his admission. When he was admitted, the above symptoms continuing, an attempt was made to return the hernia, but without success. He was then put in the warm bath, and continued in it for three quarters of an hour, during which time he was bled. After his return to bed two clysters of tobacco were injected, but only one was retained; during the injection he vomited. These means, combined with the Taxis, proving ineffectual, about six p. m. ice was applied over the tumour for three quarters of an hour, during which time "he felt" (as he described it) "as if his inside was violently agitated." On the removal of the ice the hernia was found to have returned into the abdomen, and his symptoms quickly disappeared.

Mode of applica-
tion.

It is improper to apply the ice to the part, wrapped up between folds of cloth, as is often done, as the melted portion constantly keeps the patient's bed wet and uncomfortable; and besides, if long continued, it produces a frost bite, and the part sloughs off. An instance of this kind occurred to Mr. Sharp and Mr. Cline, in a case which they attended in February, 1780. They directed ice to be applied to a strangulated hernia, which being continued for thirty-six hours, occasioned the integuments to become frozen about four inches in circumference. The part was white and hard, but when the ice was removed it thawed, becoming again red and warm, and soon after the hernia was reduced. The integuments which had been frozen continued red and inflamed for ten days, when they became livid, and sloughed as far as they had been frozen, but the ulcer afterwards healed without difficulty.

Substitutes for ice.

As ice cannot be procured in many situations, some substitute for it must be had. The most convenient is a mixture of sal ammoniac and nitre, first finely powdered, and mixed in equal proportions. Sixteen ounces of water being put into the bladder, ten ounces of the mixed salt is to be thrown in, and the bladder then tied up and laid upon the tumour. The degree of cold produced by this mixture is lower in the hottest weather than the freezing point of water, and if the water be previously cooled the cold will be greater.

Nitrate of ammonia and water in equal parts produce a still greater intensity of cold, but as this salt is not used in medicine, it is not easily procured. Vinegar and sal ammoniac, and vinegar with spirit of wine, generate too slight a degree of cold to be much depended on for this purpose.*

Opium.

In addition to the means hitherto described, it is proper to give opium to allay the violence of the vomiting. After copious bleeding opium is of particular service, and much assists the subsequent attempt at reduction.

Cathartics.

With respect to cathartics, the most drastic kind were formerly employed, but they have so repeatedly been found not only ineffectual in this complaint, but positively injurious, that their use is now entirely laid aside, excepting when the symptoms are very slight. If the strangulation has produced vomiting, purgatives only

* An intense degree of cold may be obtained, for the purpose of reducing large scrotal and femoral hernia, by pouring a stream of water from a height of two or three feet out of a common kettle, a vessel always readily to be obtained. As the good effects of cold seem principally to be produced by contracting the vessels of the strangulated intestine, and thus diminishing its volume, the stream should be kept up for at least twenty minutes, until the temperature of the whole tumour is lowered.—Ed.

increase it, for the stomach is so irritable that the medicine is rejected as soon as swallowed, and hence cannot have a purgative effect, whatever be the extent of strangulation in the intestine; and if the hernia be omental, little advantage could be derived from purgatives.

Where the symptoms are but slight, aperient medicines may be given, if there is either no vomiting or only at distant intervals. In such cases I have known opium, joined with calomel and cathartic extract, produce stools and relieve the patient.

In slight cases fomentations and poultices may be applied to the part with advantage, but still, even in the less urgent cases, I think them much inferior to the application of cold. In one case in which the tumour was tense, and the scrotum much inflamed, I found the application of leeches, and the subsequent application of fomentations, occasion a return of the protruded parts.*

Fomentations and poultices.

CHAPTER IX.

Circumstances to be considered previous to the Operation.

If all the methods above described have failed of success, it becomes necessary, in order to preserve the life of the patient, to perform an operation to liberate the protruded parts from their confinement.

Operation necessary.

The operation, if well performed, in an otherwise healthy person, is attended with little danger, and it is therefore natural to inquire why it has so frequently been followed by the death of the patient. The great reason of want of success in this operation is its being performed too late; so that the protruded contents have proceeded to a state of gangrene, or so nearly approaching to the gangrenous condition, that the long-inflamed parts are unable to recover their natural functions; or that the inflammation has extended to the viscera in the cavity of the abdomen, continuing the consequences of the disease after the stricture which caused it has been removed.

Operation little dangerous.

It cannot be too much lamented or condemned that so much time is commonly lost before the operation is performed. To reduce the hernia, trial after trial is made, the same means are often repeated, the tumour by being often compressed becomes excessively tender, so that the mere cessation of the efforts at reduction gives a comparative ease, which flatters the patient and his medical attendant that a part of the tumour has gone up; hopes are still entertained that an operation may be avoided, till the rapid progress of the symptoms of danger points out the fatal error of delay, and, when the operation is performed, too clearly demonstrates the impossibility of success.

Much time lost.

It would be a fortunate thing if surgeons were possessed of any criterion, which, by shewing the exact state of the protruded parts, would enable them to judge of the latest time to which the operation could be safely delayed. Hiccough has been named as the deciding symptom of the presence of mortification, but this is now known not to be accurate, since the operation has several times been performed in the hospitals of the Borough after this symptom has occurred, when parts have been found free from mortification, and the patients have recovered. On the other hand, I dissected a woman who died of strangulated hernia, in which a portion of the ilium was mortified, who had not shewn the slightest hiccough during the progress of the disease. Mrs. Bayman, of Hayes, on whom the operation was performed by my friend, Mr. Edlin, had hiccough to a violent degree in my presence, four hours before she underwent the operation; and she was not troubled with a bad symptom afterwards.

Criterion of time.

* I am induced to offer a remark on the employment of the Taxis in the reduction of a strangulated hernia from a conviction of the injury, in some cases irreparable, that is inflicted by an injudicious hand on the incarcerated gut. The force that is occasionally employed would injure a healthy intestine, and render it incapable of continuing its functions; but when used upon a convulsion of intestine, unable to elude the gripe of the surgeon, gorged with blood nearly to bursting, and with its coats in a high state of inflammation, it so bruises the part as to more than counterbalance the good derived from the reduction of viscera so damaged. It has fallen to my lot to see more than one case in which the patient has fallen a victim to a long-continued succession of violent attempts with the Taxis. These are followed by a discharge of blood per anum from the bruised vessels of the mucous lining of the gut, which frequently exhausts the patient after his hernia has been returned. Such practice is seen more in hospitals than in private practice; it cannot be too strongly deprecated. Though English surgeons do not concur in the temporizing practice recommended by Dessault, yet his cautions against rough handling an inflamed hernia, or even using the Taxis in such cases, are not unworthy of attention; and the truth of his observations on this subject will be assented to by every surgeon who has observed the comparative results of operations for hernia when forbearance has been exercised.—ED.

Performed before
tension of the
belly.

In every case to which I have been called, I have been anxious to perform the operation before the occurrence of soreness of the belly under pressure. Soon after the symptoms of strangulation appear, the abdomen becomes tense, owing to the flatulent distention of the intestines, but still the patient does not immediately complain of soreness upon pressure; but when, in addition to the tension, pressure on the abdomen gives much pain, it is a proof that the inflammation has extended into that cavity. In this state there is peritoneal inflammation to contend with, which, unfortunately, the operation itself, though the only method of removing the stricture, is calculated to increase; so that on opening the cavity of the abdomen, this inflammation spreads through its cavity and destroys the patient.

Therefore as soon as bleeding, the warm bath, the tobacco clyster, and topical cold, have been fairly tried, and have proved unsuccessful, if the abdomen is becoming affected, the operation should be no longer delayed; and indeed if the warm bath cannot be conveniently and quickly procured, it is better to omit it altogether, than to endanger the patient's life by further delay.

This soreness, upon pressing the abdomen, is a much better criterion than the time which has elapsed since the occurrence of the first symptoms of strangulation, for there is the utmost variety in the time that elapses between these symptoms and a fatal termination. There is a drawing of a large intestinal and omental hernia in the Museum at Saint Thomas's Hospital, which Mr. Else used to state in his lectures proved fatal in eight hours from the first appearance of strangulation; under these circumstances death is not occasioned by mortification, but by the constitutional irritation which the inflammation of so large a surface occasions. On the other hand, I have known the operation successfully performed at the end of eight days after the accession of the symptoms of strangulation, although death generally happens on the sixth or seventh day from the commencement of the symptoms. I have known an instance of fatal termination within three days from the descent of the rupture.

Pulse a criterion.

Some judgment may be formed from the pulse, and from the patient's general appearance: if the pulse be so small as to be scarcely perceptible, and the countenance anxious and sunken, no time is to be lost; but even under these circumstances, and with hiccough superadded, I have known the operation succeed.

Operation at any
time.

Indeed there is scarcely any period of the symptoms which should forbid the operation; for even if mortification has actually begun, the operation may be the means of saving life by promoting the ready separation of the gangrenous parts, and relieving the distended intestine.

Patient's consent
quickly gained.

It will be said that it is difficult to obtain the patient's consent to an early operation; but this I have never found, where the precise state of the case was fairly represented. The almost certain fatal consequence of delay, and the inconsiderable degree of pain which is inflicted in this, compared with many other operations, seldom fail to gain the patient's consent of submitting to the only remaining method of relief from his sufferings and his dangerous situation.

Operation required
most frequently for
small herniæ.

Though a large hernia, when completely strangulated, is more rapidly fatal than a small one, the latter, being commonly the most severely compressed by the stricture, demands the operation more frequently than the larger hernia.

Omental least
dangerous.

An omental hernia, though much more difficult to reduce than an intestinal, is not so dangerous; being slower in its progress, and producing much less violent symptoms, so that the operation may be delayed to a later period with every prospect of saving life.*

When the omentum and the intestine have descended, the disease takes a middle course in the violence and duration of its symptoms, and the intestine generally suffers less from the strangulation, than when unaccompanied with omentum.

Several herniæ.

When more than one irreducible hernia exists in the same person, it is sometimes difficult to determine which it is that requires the operation. This will be illustrated by the following case, which occurred during the spring of 1803 at Guy's Hospital.

Case.

A woman was admitted with three herniæ, two in the groin and one at the pavel. The umbilical hernia, and that of the left groin were irreducible; that of the right groin felt extremely sore upon pressure. A doubt arose which was the hernia that required the

* When from the nature of the symptoms the case appears to be merely an omental hernia, the operation must not be hastily proposed, for it is not easy to distinguish between inflammation of omentum which has been irreducible, and strangulation; for the inflamed state of the omentum, without strangulation, the operation will afford no relief; on the contrary, it will aggravate the inflammation. It is highly advisable, therefore, to try the effects of active general depletion, and the application of leeches to the part, under which treatment the symptoms will often disappear. The result of operations on omental herniæ, which have been attended by acute symptoms, as great tenderness of the part, continued sickness, tense and tender belly, has been such as to induce me to try every means of allaying the inflammatory action before resorting to the operation. The operation in the cases that have come under my notice has not suspended the symptoms, as it generally does in enterocele; but the patient has sunk within a few hours from the effects of the inflammation.—ED.

operation ; but as the symptoms of strangulation were not extremely urgent, though the woman was very low, it was agreed to wait till the next day for a consultation. During the night, however, she died, and upon inspecting the body, the tumour in the right groin was found to be an enlarged and inflamed absorbent gland lying over an empty hernial sac. In the left groin was a portion of inflamed intestine, and at the navel was an irreducible omental hernia which had suppurated and contained about a table spoonful of matter.

This woman complained chiefly of pain in the right groin, and if the operation had been performed, this would have been the tumour laid open. This case also furnished another observation ; though this woman had several herniæ, yet the operation, on whichever it had been performed, would have given no relief ; as she died, not of strangulated hernia, but of peritoneal and omental inflammation. When the abdomen was opened the intestines were found adhering to each other, with matter interposed in some places ; and a considerable quantity of pus had been effused into that part of the omentum which was contained in the cavity of the abdomen. In this case, therefore, the abdomen was first affected, and the inflammation, after having extended through it, was continued to the protruded parts. Soreness of the abdomen, therefore, which in strangulated hernia is a late symptom, must here have been one of the earliest.

Disease began in the abdomen.

As a recent hernia is more difficult of reduction than one which has been long accustomed to descend, it therefore more frequently requires the operation. The latter is situated amidst parts relaxed by repeated dilatation, the recent is surrounded by parts which have great powers of resistance, and are already in a state of contraction.

Recent hernia most difficult to reduce.

The herniæ of the very young and the very old require the operation less frequently than those of the middle period of life, when the fibres are firmer, and the muscular strength more robust : in the tenderness of youth, and the relaxation of age, a reduction of the hernia by the Taxis is almost always practicable ; and it is principally in old persons that much time elapses before the strangulation produces fatal effects, the period of their sufferings having been known to be protracted sometimes to twenty days.

Most difficult in the adult.

CHAPTER X.

Of the Operation for Inguinal Hernia.

THE object of the operation is to liberate the protruded parts from their confinement, and to return them into the cavity of the abdomen, if they are found upon examination to be in a state likely to recover from the effects of the strangulation.

Object of the operation.

For this operation the patient is to be placed upon a table about three feet six inches in height, his body lying in a horizontal posture, excepting that the shoulders should be a little raised, his legs from the knees hanging down over the edge of the table, and the thighs a little bent in order to relax the abdominal muscles. The bladder should be emptied, and the diseased side must be shaved.

Position of the patient.

The surgeon standing between the patient's thighs, grasps the tumour with his left hand, and with a common scalpel in the other, commences his incision opposite to the upper part of the abdominal ring, at the middle of the sac, and two thirds down the tumour, unless it is very large.

Incision.

This incision, by which the skin and cellular membrane over the sac are cut, also divides the external pudendal artery, which always crosses the sac near the abdominal ring, and sometimes affords rather a free hemorrhage. This circumstance, however, is in no degree alarming to a surgeon who expects it, as the bleeding may be stopped by the vessel being compressed by an assistant, or if the artery is larger than usual, owing to the scrotum being long distended by the disease, the blood may be stopped by a ligature. This artery may be seen in plate 6. It arises from the femoral artery just below Poupart's ligament, and passes to the skin of the penis and scrotum, crossing the spermatic cord near the abdominal ring.

Bleeding.

This incision which divides the skin and cellular membrane exposes the fascia which passes off from the external oblique muscle, and which forms the first and thickest covering of the sac. The middle of this fascia is next cut through, and a director introduced beneath it, is carried upward to within an inch of the abdominal ring, and the fascia is divided upon it ; and again by turning the director downwards, a similar division of the fascia is made to the bottom of the tumour.

Fascia exposed.

- Cremaster muscle.** This opening through the fascia exposes the second covering of the hernial sac, viz. the cremaster muscle; which must be also divided both upwards and downwards with the assistance of the director, precisely in the same manner as the fascia.
- Sac.** When these coverings are cut through, the sac itself becomes perfectly exposed. It should be remarked that to those not accurately acquainted with the anatomy of the part, the division of these layers causes great embarrassment and delay; for the operator expecting to see the sac itself as soon as he has divided the common integuments, cuts the fascia with extreme caution, fibre after fibre, from fear of injuring the intestine beneath, mistaking this thickened covering and the cremaster muscle for the hernial sac.
- Fluctuation.** When the sac is completely exposed, if the hernia is intestinal, and the intestine does not adhere to the sac, a sense of fluctuation may be generally perceived at its anterior and inferior part, when the tumour is grasped, and the fluid which it contains is pressed forward.
- Sac opened.** The surgeon is next to pinch up with his finger and thumb some of the cellular membrane, which closely adheres to the anterior and inferior part of the sac; and when the sac is thus raised, and separated from the intestine, he is to place the edge of the knife horizontally, and to cut a small hole just sufficiently large to admit the blunt end of a probe or that of a director, upon which the sac is to be further divided upwards to the abdominal ring, and downwards only so far as to enable the operator to bring its contents into view.* The reason that the anterior and inferior part of the sac should be selected for the first incision into it is, that the intestine seldom descends so low, and if it does, the fluid which it contains is generally found interposed between the intestine and that part of the sac.
- Fluid escapes.** As soon as the sac is opened a quantity of fluid escapes; its colour, if the strangulation has not been long continued, is that of serum; but if the intestine has been for a long time compressed, it becomes of a coffee colour, and sometimes offensive to the smell.
- Its quantity.** Its quantity, if there is no adhesion of the intestine to the sac, is proportioned to the quantity of intestine strangulated, for if adhesion exists, little, if any, is found, so that the surgeon who depends upon meeting with it, would wound the intestine in the operation. In the omental hernia also there is seldom any fluid in the sac, and if any, a comparatively small quantity; for this fluid seems to be principally a secretion from the surface of the intestine.
- Contents of the sac.** When the sac is opened the contents of the hernia appear; and if both the intestine and omentum have descended, the latter is the first that presents, and generally covers, and sometimes entirely envelopes the intestine.
- Omentum.** The omentum retains much of its usual appearance, its colour being only a shade darker than natural; but the
- Intestine.** intestine is covered with a coat of coagulable lymph, and appears red if it has not been long strangulated, but of a chocolate brown colour if the stricture has been very tight, or the strangulation long continued. The veins upon it are turgid with blood, and I have seen the lacteals upon the jejunum and ilium distended with air.
- Situation of the stricture.** The next part of the operation is the division of the stricture, and the surgeon carries his finger into the hernial sac to examine accurately into its situation, which he will find in one or other of the three following parts.
- First, at the external abdominal ring.
- Secondly, above the ring from one inch and a half to two inches, and inclining outwards towards the spinous process of the ilium.
- Thirdly, in the mouth of the hernial sac.
- Division of the abdominal ring.** If the stricture is owing to the pressure of the columns of the tendon which form the abdominal ring, it is then to be divided in the following manner. The surgeon passes his finger into the sac as far as the stricture, and then conveys a probe-pointed bistoury on the fore part of the sac, and insinuating it within the ring, cuts through it in a direction upwards opposite to the middle of the sac, and to an extent proportioned to the size of the tumour. The dilatation of the ring should not be larger than is sufficient to return the protruded parts; but it should allow them to pass without committing any violence by the pressure exerted in effecting their return. In general, if the finger can be readily admitted into the abdomen, by the side of the protruded parts, the dilatation is sufficiently free.
- It is best to divide the stricture by passing the knife between the ring and the sac, as a larger portion of

* The separation of the coverings during an operation is objected to by some, as being unnecessary, and rendering the operation very severe and tedious. The circumstance, however, of the vessels of the spermatic cord being sometimes found separated, and thrust to the fore part of the sac, renders this practice not wholly useless. A case has been given in an earlier part of this work, in which the operator divided the vas deferens, by neglecting this precaution, and dilating the whole tunics at one incision after he had opened the sac; and the possibility of this variety in the course of the vessels prompts the recommendation of our author, not to dilate the sac downwards lower than is requisite for the examination of the contents of the hernia.—Ed.

peritoneum is thus left uncut, and the cavity of the abdomen is afterwards more easily closed. The direction given to the knife in dilating the stricture has been usually upwards and outwards towards the spine of the ilium, but I prefer doing it directly upwards, for the following reasons.

First, as the upper aperture should only be dilated directly upwards, it is better that the surgeon should have one general rule for the use of the probe-pointed bistoury, applicable to every case of inguinal hernia, than to be perplexed in the operation by a variety of directions, which only partially apply to one or other seat of the stricture; and secondly, the division of the external ring in this direction weakens the abdomen less than upwards and outwards, because as the cord passes towards the abdomen in that direction, and the hernial sac is parallel with the cord, a dilatation in that course takes off the resistance which the tendon would otherwise make to any future descent. When the ring is divided directly upwards, the upper column of tendon which forms it is cut; when it is dilated upwards and outwards, the transverse fibres uniting the columns are divided. The dilatation upwards is equally safe with the other; if this were not the case, no subordinate advantage ought to interfere with the most important one of security. Another, and perhaps more important, reason for practising the division of the stricture upwards, in all cases of inguinal hernia, is the variety in the situation of the epigastric artery, which is sometimes found on the outer side of the neck of the sac. In such a case it would be inevitably divided by an operator who adopted the mode of dividing outwards; for we possess no certain criterion whereby to ascertain whether it be a common oblique or a direct hernia, the two abdominal apertures being often brought so close in apposition as to lead to the erroneous idea of the hernia being of the direct species. *See Plates 3, 4, 7, 8, and 9, and Plate 11.*

Reasons for preferring the division upwards.

The most frequent situation of the stricture, however, is not at the abdominal ring, but at the place at which the sac opens into the abdomen, that is an inch and a half or two inches above, and to the outer side of the ring; and it is there occasioned by the pressure of the tendon of the transversalis and internal oblique which pass over it, and by the resistance of the border of fascia which passes under it.

Stricture at the upper ring.

If the stricture is at this orifice it is to be divided as follows.

The surgeon passes his finger up the sac, and through the abdominal ring, until he meets with the stricture; he then introduces the probe-pointed bistoury with its flat side towards the finger, and with its edge towards the ilium, his finger being a director to the knife. Thus he carries the knife along the fore part of the sac until he insinuates it under the stricture formed by the lower edge of the transversalis and internal oblique muscles, and then turning the edge of the knife forwards, by a gentle motion of its handle he divides the stricture sufficiently to allow the finger to slip into the abdomen: the knife is then to be withdrawn with its flat side towards the finger as it was introduced, to prevent any unnecessary injury of the parts.

Mode of dividing it.

I have occasionally practised, and have for some time recommended in my lectures, the following mode of dividing the stricture without including the sac. The tendon of the external oblique having been divided a little above the external ring, the sac is gently drawn down, while the muscles are drawn up by an assistant. In this way the stricture is brought into view, and can be divided without risk, and without including the peritoneum. I was led to adopt this method by the result of a case related in a preceding chapter, in which I had reason to doubt whether the aperture in the intestine was not caused by the knife; when the stricture is not in view the intestines cannot be completely secured from danger; the knife is passed blindly upon the finger as a guide, and in dividing the stricture has been known to wound the intestine.

Without including the sac.

An advantage is derived from dilating the stricture without cutting the sac itself, for there is no danger of injuring the intestine with the naked edge of the knife, which I have twice known to happen when the stricture was divided from within the sac; in one case the patient died from the contents of the intestine escaping into the cavity of the abdomen, in the other the intestine was obliged to be retained in the sac to allow of the escape of the fæces by the external wound. An additional advantage is derived from this mode of dilatation, viz. that if by any mistake of the operator the epigastric artery is cut, as the peritoneum is undivided, the flow of blood would be immediately perceived, and then the vessel might be secured; whereas if the sac is included in the incision, the artery would bleed into the abdomen, and the consequences might be fatal, without the cause being known but by dissection.

Advantage.

In the following case, the stricture existed both at the abdominal ring, and at the aperture two inches and a half above it; and it is here introduced to illustrate the foregoing observations.

David Sugmund, aged sixty years, was admitted into Guy's Hospital, under the care of Mr. Lucas, on Sunday, the 25th of December, 1803, for a large strangulated scrotal hernia on the right side. The disease had existed for twenty years, but it had become strangulated only twenty-four hours preceding his admission, in consequence of a hard day of labour. As the disease resisted every attempt to reduce it, the operation was determined on, and was performed on Monday the 26th at one o'clock. On opening the sac no

Case.

other contents were found than the cæcum and its appendix, little altered in colour, but covered with a coat of lymph on its anterior surface, and firmly adhering to the sac at its posterior and upper part. When the finger was passed into the sac a stricture was found at the abdominal ring, which being freely divided, attempts were made to return the intestine. Trial after trial was made, considerable pressure was exerted, but without effect. When the finger was passed further up the sac, another stricture was found, situated two inches above the ring, which prevented the finger from being passed into the abdomen. This stricture was formed by the edge of the transversalis above, and by the semicircular border of the fascia below, both of which could be distinctly felt. A probe-pointed bistory was passed under the edge of the transversalis muscle, between it and the hernial sac, and the edge of the former was divided, when the finger readily passed into the abdomen, and the intestine, by slight pressure only, was immediately returned. The dilatation of the transversalis was made directly upwards, with considerable freedom, to give as much room as possible, as the intestine was much thickened and enlarged by frequent descent.

Stricture within
the sac.

The third seat of the stricture is the hernial sac itself, from its neck becoming thickened by the pressure of the tendons at the upper ring; but I have already said it is not so frequent an occurrence as has been imagined; for the pressure of the surrounding parts external to the sac has been often mistaken for it. It is, however, undoubtedly true, that stricture within the sac does sometimes occur, as the instance proves which I have already stated, of septa forming in the sac, as will be seen in plate 5, fig. 3, a preparation in the Museum at Saint Thomas's Hospital. It is also proved by another drawing in the same plate, from fig. 4. From the seat of the contraction in the sac in the latter instance, it would seem that it had been induced by the pressure of a truss at the abdominal ring. I lately also dissected a subject in which the peritoneum, at the mouth of the sac was considerably thickened, and had pressed upon a portion of the intestine, which it included so as to occasion its strangulation.

Case.

I saw a case of Mr. White's, surgeon, of Queen Street, in which the stricture was in the neck of the sac. Attempts having been made by Mr. W. to reduce it, and not succeeding, I was sent for, and found the scrotum much discoloured and the whole tumour unusually soft. When pressed upon, part receded into the abdomen; but at the upper part convolutions of intestine could be readily distinguished, but could not be reduced. I immediately proceeded to the operation, and endeavoured to remove the stricture by dividing the ring without opening the sac, but ineffectually. On pressing the sac to return the contents, a considerable quantity of fluid issued from a small aperture; this I dilated, and found the stricture to arise from a firm and broad ring at the mouth of the sac. Drawing the sac down a little, I brought this ring or band into view and divided it. The part of the swelling that I could reduce before the operation, proved to be a collection of water which had passed from the abdomen into the sac, and could by pressure be made to recede into the abdominal cavity. He was in other parts slightly anarcous. This patient recovered in the usual time.

A membranous band crossing the mouth of a hernial sac, will produce strangulation, by its pressure upon the intestine. This is not unfrequently met with in hernia congenita, from causes that will hereafter be mentioned.

In the spring of 1825, a case occurred at Saint Thomas's Hospital under Mr. Green, in which the stricture was caused by a firm band of membrane stretched across the inguinal canal. The hernia had been previously reducible, but had suddenly descended, and, not yielding to the usual means of reduction, became the subject of operation. Neither of the abdominal apertures were implicated in the stricture. The division of the membranous band set the intestine free; but the man ultimately sunk from enteritis.

The following is a fatal instance of the oversight of a membranous band in the sac.

Case.

A man was brought into the hospital with a strangulated hernia. The operator opened the sac, and finding some tightness at the external ring, he slit it up for some distance, but could not return the hernia: he then divided the edges of the internal oblique and transversalis muscles, but still had great difficulty in replacing the hernia within the abdominal cavity. After several attempts he turned the intestine back upon itself, and returned it imperfectly into the general cavity. The parts were brought together by suture. On the following day the intestine had protruded, and presented itself at the wound; as it was very dark coloured, he thought it better to leave it to slough. Under this process the man quickly sunk, and after death I inspected the body. I found the intestine under the influence of a stricture caused by a membranous band, which proceeded from the side of the sac and wound round the intestine. It had escaped the notice of the operator, being concealed from view by the distended intestine which overlapped it.

Mode of dividing
it.

When the stricture is in the neck of the sac, it may be brought into view in the manner I have recommended above, and divided in the same manner, with the exception of including the peritoneum in the division, which is not necessary when the stricture is external to the sac.*

* With respect to the hæmorrhage that occurs during or after the operation, there appear some circumstances which render it doubtful whether the hæmorrhage that occurs proceeds from the epigastric artery so often as is suspected. Two cases are related by Mr. Lawrence, in one of which the patient sunk under hæmorrhage, and on examination it was found to have proceeded from the division of the branch furnished by the epigastric to the cremaster. In another, in which the epigastric was found divided after death, no hæmorrhage occurred, either at the moment of its division or during the patient's life. Of this case, of which an engraving is given in this work, Mr. Lawrence gives the following detail:

A man about fifty years of age had been subject for many years to a rupture, which could be returned without difficulty. Constipation took place on 24th of January, 1806, and, as it could not be removed, he was brought to Saint Bartholomew's Hospital on the 30th of the same month. His belly was distended, but not painful; and a slight degree of sickness was present. About half way between the ring and scrotum he had a soft and somewhat elastic tumour of the size of a pigeon's egg, which bore pressure without

The following is an instance of the division of the epigastric artery, attended by profuse hæmorrhage, in which the ends of the vessel were secured by ligature, and the patient recovered. It occurred under Dr. Mackay, of the Royal Navy, and is communicated to me by my friend, Mr. Giraud, of Faversham, who assisted at the operation.

James Prescott, aged twenty-seven, coachman to Mr. Bell, on the morning of the 22nd of September, received a most severe kick Case. from a horse, whose two feet were thrown with much force against the left side of the abdomen. I saw him about two hours after the accident, and found that the blow had caused an inguinal hernia of the left side, which had descended some way into the scrotum. I tried for a length of time to reduce this hernia in the most gentle manner, but without success. He was bled, and had two laxative clysters, and desired to be kept quite quiet. In the evening I again tried to reduce the tumour, both before and after the use of a tobacco clyster. Twenty-third:—Early this morning I found that he had had a bad night, that he was in great pain, but that he had no vomiting nor hiccough, and very little fever. An opiate which I gave him relieved the pain so much that by eleven in the forenoon, when Mr. Giraud, of Faversham, saw him (by my desire), we agreed to wait as there were no urgent symptoms. He was, however, bled again, and had two tobacco clysters; in the course of the day a mixture was also ordered, with tr: digitalis in large doses every six hours; several attempts were also made during the day to reduce the tumour without effect. At night I left him easy and free from fever. Twenty-fourth:—This morning I was called up before day-light: I found him much worse; he had been in much pain almost ever since I left him last night, so that his cries disturbed every one in the house. He has now more fever; hiccough, with retching to vomit; and the abdomen feels sore and tense on putting the hand on it. I sent immediately for Mr. Giraud, on whose arrival I performed the operation in the manner recommended by Mr. Astley Cooper. On laying the sac open the contents of the hernia proved to be about an inch and a half of one of the small intestines, and a large portion of omentum. A quantity of a brownish fluid and offensive smell escaped as soon as the sac was divided, and the strangulated portion of intestine was found of a dark brown colour, with two apparently gangrened spots on its surface, one as large as a small bean, the other more rounded and not so large. The stricture being felt at the abdominal ring, I divided it upwards with a probe-pointed bistory, and on this being done attempts were made, in a very careful manner, to reduce the hernia, but without being able to succeed, as it was now found that the stricture, which prevented the return of the tumour, was situated from an inch to an inch and a half higher up than the one just divided. A probe-pointed bistory, only sharp for about an inch in the centre, was then introduced in a very careful manner to the stricture, but it was found too much curved to touch it. The common bistory was then introduced, with which the stricture was divided; but unfortunately, although the direction of the incision was upwards, yet the epigastric artery was cut directly across; of this we became immediately sensible by the sudden and profuse gush of blood, which flowed in great quantity. I introduced my fingers, with which I made pressure on the ends of the bleeding vessel. I felt them pulsate under my two fingers in a very strong manner. After continuing the pressure for some minutes, the flow of blood became much less. Mr. Giraud and myself having but one opinion of the necessity of securing the ends of the divided artery, if possible, (for it was plainly evident that unless it was tied this poor man must inevitably die), I brought his head forward, and also bending the body and leg and thigh of that side, so as to relax the abdominal muscles, I then with some force turned the edges of the parietes of the abdomen back, and after some difficulty (the division made at the abdominal ring being large, and fortunately ample enough) was so lucky as to see and take up one end of the bleeding vessel, which Mr. Giraud tied with a ligature; the other end was in like manner taken up and tied. The contents of the hernial sac were then returned into the abdomen, and the wound brought together by sutures and bandage in the usual manner.

As nothing particular occurred after this, the daily report of this man's cure is omitted. The stitches were cut out on the fourth day, and the ligatures were brought away from the artery on the eleventh. The external wound was healed perfectly by the fourteenth; and on fitting him with a truss he returned to his usual occupation on the eleventh day of October, being the sixteenth from the day of the operation.

From the dark brown colour of the intestine, and from the two still darker spots on its surface, I was extremely doubtful that the operation had been too long delayed. Should any doubts be entertained that the artery which was cut across and taken up was not the epigastric, I have only to observe that Mr. Giraud and myself have no doubt whatever on the subject, for it was not until after the ligament of the transversalis was divided (an operation which we found extremely difficult, as the stricture was so close as hardly to admit the end of the bistory on the finger) that the sudden and unexpected flow of blood took place. The violent kick from both feet of a coach-horse might, and no doubt did, displace the usual direction of the epigastric artery. The artery taken up by me, and tied by Mr. Giraud, was quite cut in two. This circumstance was also in our favour; it was as large as an ordinary crow quill.

In old herniæ it sometimes happens that the omentum becoming thickened forms bands or processes, by which the intestine is encircled; and the omentum thus becomes the cause of strangulation within the sac. Mr. Vincent communicated to me a case of this kind that occurred to him.

Stricture formed by omentum.

In a case that I operated upon with Mr. Pugh, which I relate in the next chapter as it is interesting in another point of view, the omentum so firmly girt the intestine, that I was obliged to divide it in order to relieve the

causing pain. The ring of the external oblique was perfectly free from tension; there was no testicle on that side of the scrotum. Strong cathartics and tobacco clysters having failed in procuring any relief, the operation was performed on the seventh day from the strangulation. The tumour consisted of a hernial sac full of fluid; when this had been laid open up to the external oblique, the operator discovered that a piece of intestine was strangulated in the internal aperture. He could just reach this with his finger; but he was obliged to divide the lower ring extensively, before he could remove the stricture of the upper opening: this was at last effected, and the intestine returned. No blood was shed during the operation. Mild and stronger purgatives and clysters were all equally ineffectual in removing the constipation, and the patient died on the following evening. The tendon of the external oblique muscle had been cut upwards and outwards for two inches: it had also been divided upwards and inwards for a space of three quarters of an inch. The latter incision, which had included the inferior margin of the obliquus internus and transversus, had completely divided the epigastric artery, at three quarters of an inch from its origin. It did not appear that the smallest quantity of blood had escaped from the divided vessel. Within the abdomen, and just behind the ring, there was a small piece of intestine perfectly black and gangrenous, which had been strangulated by a preternatural band of adhesion, extending from the peritoneum, close to the ring, to the mesentery. The convolutions of the small intestine, exceedingly distended (to two and three inches diameter) seemed to fill the whole abdomen. They were slightly agglutinated to each other, and marked here and there with red streaks. The lower extremity of the testis lay just in the upper opening of the ring.—*Lawrence on Ruptures.*

intestine. Another case I met with, in which, having divided the edge of the upper ring, I endeavoured to return the intestine, but found considerable resistance in the attempt. I examined the intestine particularly, and found that there was no circulation in its vessels; I then proceeded to examine the omentum, and found that it was doubled round the intestine, and adhered to the posterior part of the sac. I divided the omentum with a bistoury, and released the intestine which was readily returned.

I have operated upon a scrotal hernia, in which the omentum not only formed the stricture, but also adhered to the intestine. I detached the omentum with the knife, returned the intestine, and cut away part of the omentum. The patient recovered without any untoward symptom.

Intestine
examined.

Mode of returning
it.

When the stricture has been completely removed, the protruded intestine is to be attentively examined, to observe whether the brown colour which it assumes under strangulation, lessens or disappears; as this is a proof of the return of circulation in the part. The veins on its surface may be also emptied by pressure, and their sudden filling noted, and the intestine should be pulled down a little to make these observations on the part which has immediately been compressed by the stricture. If the intestine appears to have a free circulation, the surgeon should directly, but gradually, return it, replacing about an inch at a time, and securing each part with his fingers until the whole is returned into the abdomen. All violence and improper haste should be carefully guarded against, for the intestine is tender, and will easily tear at the strictured part. I examined the body of a woman, in whom, under this operation, but a slight degree of pressure had been used to return the intestine; and though it had been strangulated only forty-four hours, it gave way, and the contents were extravasated into the cavity of the abdomen. I shall also have occasion to mention another instance of a similar kind.

In returning the intestine after the operation, it is proper to put the patient in the same position as when the attempt at reduction is made without the use of the knife; that is, to elevate the thigh on the diseased side, and to relax, as much as possible, the aperture into the abdomen, by raising the patient's shoulders.

Adhesions.

If the intestine is connected with the sac by adhesion, an extraordinary degree of caution is required on opening the sac, as it contains little or no interposed fluid. If the bands which form the adhesion are long enough to allow of the intestine being drawn a little from the sac, they may be completely separated by dissection; but if they are so short that the intestine and sac are agglutinated together by old adhesions, and if the surface of adhesion is not extensive, it becomes necessary to cut off portions of the sac, and to return them, still adhering to the bowel, into the cavity of the abdomen. If the adhesions are recent the intestine may be carefully disengaged by the handle of the knife or the finger, and returned into the abdomen. The following is a case that occurred under Mr. Langridge, of Staines, and is an instance, among many others I am acquainted with, of the success of this practice. The adhesions appear to have been of considerable standing, and the separation of them occasioned the sac to suppurate.

Case.

The case was an irreducible scrotal hernia in a young man, twenty-three years of age; it had not been completely reduced for five years. On operating, the superficial fascia appeared considerably thickened, the cremaster not particularly so. The first opening into the sac gave issue to an unusual quantity of water, I should think from four to six ounces. The hernia consisted of a portion of the small intestine; there were very firm adhesions of this to the inner surface of the sac, which required much tedious and difficult dissection. The intestine, lower part of the sac, and upper part of the tunica vaginalis, were agglutinated into one substance; there were also very firm adhesions about the neck of the sac. However, after much dissection, the intestine was at length returned: the stricture was at some distance within the ring, and on its division the patient felt immediately relieved. On the third day the whole scrotum swelled, and was very painful; on the fourth it continued to increase in size, and the sutures burst; on the fifth, in the evening, about three ounces of matter escaped suddenly from the wound; it continued discharging in diminished quantity till it filled with granulations, when it speedily cicatrised, and there has been no appearance of hernia since.

Adhesions of the
intestine to the
mouth of the sac.

Sometimes the adhesion exists only at the orifice of the sac, all the lower part being perfectly free; a circumstance which requires great caution in the operation to ensure the entire return of the protruded intestine, as otherwise the operation will fail of its object.

Case.

On February the 26th, 1799, a person was taken into Saint Thomas's Hospital, for a strangulated inguinal hernia; the attempts made to reduce it were unsuccessful, and the operation was performed on the day of his admission. The omentum was very much thickened, and a large portion of it was removed. The intestine was found very difficult to reduce, from an adhesion between it and the mouth of the hernial sac; but it was at length apparently returned into the cavity of the abdomen. Two stools were procured by clysters on the twenty-seventh, but from that time till the 9th of March, on which day he died, he had no stool. On examination of the body, the ilium, which was the intestine that had been strangulated, was found in the mouth of the hernial sac, and doubled back within it; the small intestine above this portion was inflamed and greatly distended, and the jejunum was in a state of mortification. The large intestines were empty and much contracted. These adhesions, therefore, by preventing the complete return of the intestine, occasioned the death of the patient.

It is an operation of extreme difficulty and delicacy to divide these adhesions at the mouth of the hernial sac. It requires that the sac should be dilated to its mouth, and that the tendon of the external oblique should be slit up to the part at which the hernia descends from the abdomen. Great danger of wounding the intestine, even when the parts are thus completely exposed, attends the division of the adhesions. Difficulty of removing them.

It sometimes happens that the convolution of intestine in the hernial sac has its sides glued together by recent adhesions. When this happens, it is right to separate them before the intestine is returned, because the stools do not readily find their way through an intestine which is thus doubled. Folds of intestine adhering.

A man who was operated upon in Guy's Hospital, and had the intestine returned in this adhering state into the cavity of the abdomen, had no stool after the operation; and upon examining his body, no other cause for his death was found, than that the portion of intestine had not entirely recovered its natural colour, and that one portion of it was placed parallel to the other, confined in that situation by adhesion. The fæces had accumulated above this part, having found no passage through it. Case.

If the colon has protruded, and the person be corpulent, the fatty appendages of this intestine are found more diseased than the intestine itself, so that it becomes necessary to remove them. Appendices epiploicæ removed.

A lady, a patient of Mr. Pidcock's of Watford, had a large hernia, which became strangulated, and required the operation. When I opened the sac, I found that it contained the colon. This intestine was much discoloured, but the appendices epiploicæ were still more so, and did not recover their natural hue when the stricture was removed; I therefore cut off all those appendages from the surface of the colon, and returned the bowel. No hæmorrhage ensued, and the lady recovered, contrary to my expectations, as besides extraordinary obesity, she actually laboured under ascites, and a large quantity of water was discharged during the operation. Case.

When the intestine has been returned, the omentum is to be examined with attention, and if it is in a healthy state, and not of very considerable bulk, it should be returned into the cavity of the abdomen by as slight a pressure as possible. But if it is very bulky, a part of it should be removed; which may be done by the knife with great freedom, and, if properly managed, without any danger. I have myself removed it, in several instances, without the patient seeming to suffer any subsequent inconvenience. The surgeon raising the omentum, whilst an assistant grasps it higher up to prevent its return into the abdomen, cuts it off near the mouth of the sac. Some small arteries always bleed, which are to be secured by a fine ligature; and when the hæmorrhage is stopped, the omentum is to be returned into the abdomen, with its divided surface applied to the mouth of the sac, from which the ligatures are suspended, and it thus forms a plug that shuts up its cavity.* In the case of Henderson, a patient of Mr. Pugh's, the truncated omentum prevented any descent after the operation. It is now twelve years since the operation was performed, and he continues free from any tendency to hernia. Omentum returned.
Removed.

Jeremiah Clare, aged thirty-seven, was admitted into Guy's Hospital, June 28th, 1814, with a strangulated inguinal hernia, which had been so for a week, during which time various means had been employed for its reduction. The man complained of vomiting immediately any thing was taken; he had hiccough, and his pulse was small and quick, with pain in the hypogastric region and in the tumour. I performed the operation at three o'clock, p. m. On opening the sac a quantity of fluid escaped, and a portion of omentum came into view; on enlarging the opening, and drawing aside the omentum, a fold of intestine was found of an extremely dark colour, but no appearance of mortification; the stricture was dilated in the usual way, and the intestine returned. On examining the omentum, its vessels appeared extremely turgid, and the blood scarcely moving in them; this, together with its large quantity, determined me to remove it, which was done, and the blood was found coagulated in some parts; as there was no hæmorrhage it was returned into the abdomen. The wound was closed by means of sutures and adhesive plaster, and the man returned to bed, with directions to take three table spoonsful of the following mixture until evacuations were procured:—Magnesia sulphatis one ounce, aq: pur: six ounces. By the following morning twelve or fourteen evacuations had been obtained; his hiccough had left him, his vomiting ceased, and his pulse was more full and slow. His food was ordered to consist chiefly of good broths, from which period the man quickly recovered. Case.

The practice of applying a ligature round the whole of the protruded omentum, to make it slough away, though it has had its advocates, is now very generally laid aside. Indeed it appears extraordinary that it should Tied.

* The practice of cutting off large portions of omentum, not only when gangrenous, but also when from its size its return seems not advisable, has been so frequently and with so much success followed at our hospitals, that it is now resorted to whenever the propriety of its return becomes a question. Before replacing the cut surface, every bleeding vessel should be carefully secured by means of a common thin silk ligature, as secondary hæmorrhage is difficult to arrest, and might endanger the life of the patient. To effect this object with more certainty, the omentum should be unfolded before it is divided by the knife; otherwise, the cutting off the omentum in a mass prevents all the vessels being seen, and when returned into the abdomen they bleed profusely. The following case occurred to myself this summer at Guy's Hospital. A female in advanced years was sent into Guy's Hospital by Mr. Pugh, surgeon in the city, with a strangulated femoral hernia, on whom I performed the operation, and removed a large portion of omentum with one stroke of the knife, securing the bleeding arteries before returning it to the mouth of the sac. In four hours after the operation, blood of an arterial colour began to ooze from the sac, and soon increased in quantity to alarm the dresser. He used pressure and cold to no purpose. Her pulse began to falter, and her face was bedewed with a cold perspiration; and in this state I found her, when early on the following morning I was called to see her. It was evident she had lost a very large quantity of blood, and had she not possessed an unimpaired constitution she could not have supported the loss. I opened the sac, removed the coagulum with which it was filled, and was proceeding to look for the bleeding vessel of the omentum, when I fortunately observed the hæmorrhage had suddenly ceased. The only ill effects of the hæmorrhage was the disturbance in the adhesive process, and the consequent suppuration in the sac, as she ultimately perfectly recovered.—ED.

ever have prevailed. The very object of the operation for hernia, is to take off from the omentum the stricture derived from the pressure of a surrounding tendon, which acts as a cord upon the part; and no sooner is this removed, than the surgeon applies a ligature, which produces a more perfect constriction than that which had previously existed.

Case.

A man, twenty years of age, was admitted into Saint Thomas's Hospital in the year 1790, for a strangulated omental hernia. Upon performing the operation, the quantity of omentum was found to be so large that there was no possibility of its being returned, and for the purpose of its removal a ligature was applied around it. He experienced no relief from the operation, and died on the seventh day from that on which it had been performed.

I have, however, several times known the omentum tied, and the patient still recover; but it appeared to me that its living powers had been already destroyed by the pressure of the stricture; and if the part is mortified, a ligature cannot excite constitutional irritation, or produce any dangerous consequences; but, on the other hand, its application is attended with no utility, as the omentum would have sloughed if the thread had not been used.

Mortified.

If mortification has taken place in the omentum, it is to be removed by excision at the sound part, in the manner I have already described. Even if there is only suspicion, and not positive certainty, of the omentum being mortified, it should be cut away; as the removal is, so far as I have seen, unattended with danger; and its return into the abdomen, if mortified, or even approaching to that state, attended with the utmost hazard, and generally proves fatal. One exception, however, to this opinion, I have seen.

Omentum
sloughing.

Case.

A man underwent the operation for hernia in Guy's Hospital, and the sac was found to contain both omentum and intestine, which, as they appeared not mortified, although considerably changed, were returned into the abdomen. On the sixth day after the operation the man appeared to be dying; his pulse was extremely feeble, and he complained of severe pain in the abdomen. The ligatures upon the scrotum were cut away, fomentations and poultices were applied to the wound, and on the following day a small portion of omentum protruded in a gangrenous state. More of it continued to come down, in this state, from time to time, during seven days, after which the whole portion, which had been originally contained in the hernial sac, appeared in the wound, and gradually sloughed off. The wound then healed, and the patient recovered. This favourable termination could only have happened in a case in which the mouth of the hernial sac was wide, and where the omentum was lying in the abdomen just opposite its orifice.

Adhesion of the
omentum.

If the omentum adheres to the sac, the adhesions may be cut through with considerable freedom, and the bleeding vessels being secured, the omentum should then be returned into the cavity of the abdomen.

Scirrhus
omentum.

It is sometimes necessary to cut away the omentum, on account of its being in that scirrhus state, which it often acquires by long residence in the sac. A case of this kind occurred in a man who was operated upon for a hernia congenita; and the omentum being thus diseased, formed a large and hard tumour, which is preserved in the Anatomical Museum at Saint Thomas's Hospital.

CHAPTER XI.

Mortification of the Intestine.

Symptoms.

THE symptoms attending this state of the intestine are denoted both by the constitutional symptoms of the patient, as also by the change which the hernial tumour undergoes. The pulse becomes fuller and softer than during the inflammatory stage, but is often intermittent; the hiccough and tension of the abdomen still continue, but the vomiting is less frequent. The patient expresses himself comparatively free from pain, and leads the unwary practitioner to consider his symptoms as more favourable; the glassy eye is also a general attendant upon gangrene. The tumour, which was tense and elastic, becomes soft and doughy; the skin, which is at first red, assumes a purple hue; the cellular membrane of the hernial coverings becomes emphysematous, and gives a crackling sensation under the fingers. The hernia will now sometimes return into the cavity of the abdomen with little or no effort on the part of the surgeon, which dooms the patient to a speedy death. Sometimes the integuments slough and ulcerate, the intestine gives way, and the faecal contents escaping from the opening, the symptoms of strangulation cease. An artificial anus thus becomes sometimes established, through which, frequently during the remaining part of the patient's miserable existence, the faeces are discharged.

With respect to the treatment that is required for these cases of sloughing hernia, I believe that very little more can be done than to hasten the process of separation by fomentation and poultice, and to support the strength of the patient by generous diet and tonic medicines; and that any attempt to lead the fæces into their natural passage, before the sloughing process is completed, will only irritate the parts, interfere with the regular process of separation, and endanger the life of the patient. Treatment.

It sometimes happens that the fæces will pass, for a considerable time, through the artificial opening, and a reparation of the canal will be effected by nature's efforts alone, the fæces resume their natural course, and the external wound heal. My friend, Mr. John Cooper, of Wotton-under-Edge, Gloucestershire, has allowed me to insert the following case, which occurred under his care, as illustrative of this natural process.

Mary Perkins, aged sixty, a poor woman who resides at Kingswood, desired Mr. Cooper to see her on account of a crural hernia. She appeared to be sinking fast, and the hernia was in a state of mortification; she had fallen down stairs a fortnight before, and soon after discovered a tumour in her groin, which gave excruciating pain, produced vomiting and constipation, which had continued from that period to the time at which he saw her. As mortification had already begun, it was thought there was little chance of saving her life; no other direction was given but that her strength should be supported by every means which were in her power to procure. In a few days the mortified parts began to slough, and the whole of the fæces passed through the artificial anus for three months, during which time several inches of one of the small intestines were discharged at the wound. At the expiration of three months a small portion of the fæces began to take their natural course, and the quantity gradually lessened, until at the period of six months from the commencement of the symptoms, the fæces passed entirely by the rectum, and the wound became perfectly healed. A few days after the mortification had begun in the groin, a tumour formed near the ilium, on the same side, which proceeded to mortification, and an inch of intestine was discharged; the wound continued open for a month, and then healed. She took large quantities of bark and cordials during her confinement, and is now as well as she has been for many years. Case.

So much violence is not unfrequently used, in the attempts to reduce the hernia, that the coats of the intestine give way under the Taxis, and the operator, on opening the sac, discovers an aperture from which fæcal matter issues. A small wound may be inflicted upon the gut, by the knife of the operator, from want of caution in dividing the stricture, or from neglect of the advice which I have given in the preceding chapter, namely, to bring the stricture into view, by drawing the sac gently down while the abdominal muscles are held up by an assistant. When this accident occurs, and the aperture in the gut is very small, the surgeon is to employ a different mode of treatment from that required for gangrened intestine; the indiscriminate use of one kind of treatment would subject the patient, in the present case, to the risk of a fæcal fistula, which, by the following expedient, may be altogether avoided. The aperture, with a small portion of the surrounding gut, should be pinched up with a pair of forceps, and a fine silk ligature, being passed around it, should be secured so as to include the ruptured spot; the intestine should then be returned to the mouth of the sac. The following case is a successful example of practice, and as it serves to shew the degree of constitutional disturbance that attends it, I here give the detail of the case from the notes of Mr. Lambe, who diligently watched its progress. Small opening.

Joseph Curtis, butcher, aged twenty-one years, was brought into Guy's Hospital on Friday morning, the 9th of December, 1808, about eleven o'clock, labouring under symptoms of strangulated hernia. He was under the care of Mr. Hooper previous to his being brought to the hospital. He got up in the morning of the 9th, about seven o'clock; about an hour after was attacked with violent pain in the region of the stomach; about ten minutes after this a tumour appeared in his left groin, which was very hard and tense, and gave considerable pain on pressure being made. He endeavoured to make it disappear, but found, after repeated attempts, that he could not. Mr. Hooper was then sent for, who examined the tumour, and found it to be a hernia; he attempted to reduce it in the usual way, but without success. Ten ounces of blood were then taken from his arm, and another unsuccessful attempt made to reduce it; he vomited a greenish coloured matter, which had a most bitter taste. Mr. Hooper, finding that he could not reduce it, thought proper to send him to the hospital. He was put into the warm bath, and the hernia attempted to be reduced, both by Mr. Lucas and Mr. Cooper, but without success. Mr. C. ordered a tobacco injection immediately, one drachm of the leaves to a pint of water, one half of which was thrown up; about ten minutes after which sickness was produced and he vomited; the tumour was again examined by Mr. C., was found much softer, but still irreducible; the other half of the injection was thrown up, which in a short time produced syncope; as this was a most favourable opportunity for the reduction of it, another attempt was made, but still without success; he vomited occasionally. Mr. C., finding that he could not reduce it, determined on performing the operation. The man was brought into the theatre about half-past three o'clock, was then very much under the influence of the tobacco injection; some mint julep was given him, he took about a table spoonful of it, which revived him a little; his pulse was at this time 60 and rather irregular. Mr. C. then performed the operation. About four inches of the small intestines were found in the sac of a dark reddish colour, with the testicle at the lower part. The fore finger of the left hand was introduced, and the stricture was found at the mouth of the sac, which was divided; a fluid of a yellowish colour escaped, and on turning up part of the intestine an opening was found in it from which fluid escaped, which was immediately secured by laying hold of it with a pair of forceps, and then tying it with a ligature. The intestine reduced, the integuments were secured by five stitches and strapping. The patient bore the operation very well, and seemed much better after it. I saw him about two hours after the operation; no stool, pulse 96 and irregular; complained of great pain in his back; an ounce of castor oil was given him about nine o'clock, but no evacuation was procured. Case.

Saturday, 10th. Slept but little, was very restless, has had no stool nor passed any urine since the operation; complains this

morning of great pain in his back; mouth dry and parched, very thirsty, tongue foul; pulse 120, regular, but hard. Another ounce of castor oil was given him this morning, but no stool; eight ounces of blood were taken from him, which, upon standing some time, exhibited a slight degree of buffy coat; passed a large quantity of urine this forenoon about twelve o'clock; belly rather tense, and very tender on pressure. Mr. C. ordered eight ounces more blood to be taken away, which was done at half-past two. Pulse sunk to 112 at three. An injection was given, which came away about ten minutes after; fourteen leeches were applied to the abdomen, and the bleeding encouraged by chamomile fomentations. At four o'clock five grains of calomel were given; about an hour and a half after he had a stool, which relieved him considerably. A quarter before six had a copious loose stool, and at a quarter after six another. Belly not so painful on pressure; pulse 128, rather hard; considerable thirst; inclined to sleep; tongue white on the edges, and red in the centre; thinks himself upon the whole easier, but very weak, and complains of cold all over his body; troubled with wind upon the stomach. At nine o'clock Mr. Stocker saw him; pulse 145, rather small; great pain on the abdomen; there was a dark appearance around the umbilicus. Ten o'clock: pulse 145, small and hard; at present dosing. Twelve o'clock: had a loose stool; pulse 132, still hard; sleeps occasionally, but when awake appears stupid.

Sunday, 11th. Had three stools during the night; pulse 150; tongue, mouth and thirst as yesterday; ate a piece of toast which he asked for, and seemed to relish it. One o'clock: pulse as before; pain and tenderness of abdomen much better; skin hot and dry; complains of much pain in the back; countenance flushed; stupor, with a degree of delirium; tongue brown and hard; thirst intense; has had two stools since nine o'clock; very little change during the rest of the day.

Monday, 12th. One o'clock in the morning: pulse 170, small; says he sees mountains; head giddy; thirst great; no stools since twelve at noon on Sunday; had one this morning at six, and another about nine. Five grains of calomel were given him at two; dressings were taken off the wound, which was inflamed. A poultice was ordered every twelve hours, and chamomile fomentations. Seven in the evening: has had three stools; wound not so much inflamed; thinks himself easier from the fomentations; is now perspiring; pulse 164 and hard; tongue as before; thirst considerable.

Tuesday, 13th. Ten o'clock in the morning: had four stools last night. One o'clock: has had two stools since nine; pulse 126, rather soft; complains still of wind at his stomach; pain of abdomen less; tongue and thirst as before. Four o'clock: tongue rather moist; Mr. C. cut away two of the ligatures from the wound, a slight discharge of matter followed; pulse 126, soft and regular; skin moist; tongue and thirst as before; seems inclined to sleep; fomentations to the abdomen continued; if the bowels continue loose is to take eight grains of the pulv. ipecac. comp.; is also to have some broth which he asked for.

Wednesday, 14th. He did not require the powder yesterday; took about half a pint of broth last night, which he relished; was rather restless during the night, and at times delirious, which was occasioned in part by the sudden death of a patient immediately opposite to his bed. Pain of back gone; complains still of pain in the region of the stomach; face rather flushed; tongue as before; thirst not so great; has had no stool nor passed any urine since yesterday about four o'clock; pulse 104, soft; wound still considerably inflamed, and the inflammation, which is of the erysipelatous kind, extends down upon the ilium; there is a slight discharge of purulent matter from the wound; fomentations and linseed meal poultice continued; seems inclined to sleep. Four o'clock: pulse 92, and good; continues to complain of the pain in the region of the stomach; has had no stool nor passed urine; tongue and thirst as before; appearance of the wound the same; has had some roasted apple, which he relished much; is to have two grains of calomel immediately, and if he does not pass his urine before eight o'clock, a hollow bougie is to be introduced into his bladder, and the water drawn off. Seven o'clock: has made water without the assistance of the bougie, and is relieved; other symptoms as before.

Thursday, 15th. The calomel produced no evacuation; at nine at night an injection was given him, which did not operate; at two in the morning another was given, and at four he had a copious stool of good colour and consistence; took this morning two cups of coffee and part of the bottom of a roll: about ten o'clock had a cup of panada; pulse 80, and natural; tongue cleaner and moister; thirst continues; upon the whole he is much better; and, to all appearance, he is recovering fast. One o'clock: he is just going to take a basin of broth, which he seems to relish very much; wound much less inflamed, and discharges matter of a better colour and consistence; fomentations and poultice continued; ligature not yet come away; does not complain of pain in the region of the stomach to day; pulse 80, but rather full. Mr. C. saw him at four o'clock, and thinks him much improved since yesterday.

Friday, 16th. Eleven o'clock: yesterday afternoon he took two cupsful of tea, and three parts of a muffin; took half a pint of broth and some bread for supper; had two stools in the night, also passed his urine three times. Had two cups of coffee and a round of toast for breakfast, and is just preparing to take some mutton broth; was restless during the night; pulse 80, and natural; face not so much flushed as yesterday; tongue moist and cleaner; thirst not so great; wound much less inflamed, and discharges matter of very good colour and consistence; complains to day of wind at the stomach returning; nates sore from laying; upon the whole much better than yesterday.

Saturday, 17th. Eleven o'clock: was delirious during the night, got out of bed and walked through the ward; had one stool during the night. Took this morning for breakfast three cups of coffee and two rounds of toast; pulse 92, and natural; in every other respect as yesterday; wound discharges very good matter; fomentation and poultice continued.

Sunday morning, 18th. Slept very well last night; no stool since Friday morning; passed his urine regularly; pulse 92, and natural; tongue clean; thirst and wind at stomach as before; wound looks very well, and continues to discharge good matter; fomentations and poultice continued; he had tea and toast for breakfast this morning, which he relished very much; seems to improve very fast in every respect; ligature not yet come away.

Monday, 19th. Slept pretty well last night; took two grains of calomel on Sunday afternoon, which procured one stool; pulse 88, and natural; tongue swelled and very painful; Mr. C. took away the ligature yesterday, no feculent discharge followed; wound continues to discharge good matter; other symptoms as before.

Tuesday morning, 20th. He was rather restless last night; no stool; pulse 90; tongue continues sore; appetite pretty good; thirst rather increased; wound discharges good matter, and looks very healthy, and is now to be dressed with simple dressings, and a small slip of adhesive plaster over them; wind at stomach as before; is to have one ounce of castor oil.

Wednesday, 21st. Slept pretty well; took some castor oil, which procured stools; pulse 88; pain at stomach very great

this morning ; was relieved by flannels applied wrung out of warm water ; tongue cleaner ; thirst not so great ; wound looks exceedingly healthy.

Thursday, 22nd. Had stools regularly yesterday ; pulse 88 ; pain at stomach better ; wound improves.

Friday, 23rd. Stomach to day much better ; in every other respect as yesterday.

Saturday, 24th. Is gradually improving ; wound looks very healthy.

Sunday, 25th. Wound looks exceedingly well ; in every other respect as before.

Monday, 26th. Eleven o'clock : no stool since Saturday ; complains of head ache to day ; pulse 104 ; wound looks well. Nine o'clock in the evening : Mr. Cooper saw him, and ordered one ounce of castor oil to be given.

Tuesday, 27th. Took the castor oil last night, which procured two copious stools ; pulse 88 ; head ache gone ; wound looks well ; is much better to day than he was yesterday.

Wednesday, 28th. Has been out of bed this forenoon, and sat up about two hours ; wound looks well, and heals very fast.

Thursday, 29th. Has been up the greater part of this forenoon, and says he finds himself getting stronger every day.

Discharged cured on Tuesday, 17th of January, 1809 ; when we had the pleasure and satisfaction to see the patient completely recovered from an operation, the circumstances attending which were remarkable, and such as will tend to throw much light upon a subject hitherto but little understood.

It will sometimes happen that the intestine may appear, during the operation, free from the usual marks of gangrene, and yet in a few days the fæces will be discharged from the wound ; this will occur when the strangulation has gone so far that the intestine cannot recover its circulation after being returned into the belly ; it is advisable under such doubtful circumstances, to replace the intestine at the mouth of the sac, that the fæces may be readily evacuated at the wound as soon as the gangrenous portion begins to separate by the ulcerative process.

Intestine sloughing after its return into the abdomen.

Mr. Turner, a very excellent surgeon at Yarmouth, in Norfolk, was called to a man near Lowestoff, who had long laboured under an inguinal hernia, which was then strangulated. The operation being proposed and consented to, a large part of the omentum, and a small portion of intestine were found in the hernial sac. A part of the omentum was removed, and a ligature passed through the remainder, and loosely tied, and both the intestine and the remaining portion of the omentum were placed at the mouth of the hernial sac, probably from a suspicion of what afterwards happened being likely to occur. The edges of the wound being brought together, the symptoms of strangulation soon ceased, and he had regular stools for nine days ; but upon the tenth, fæces were discharged at the wound, though a part still passed by their natural channel. The fæces continued to pass for eleven weeks, in part by one channel and in part by the other ; when the wound healed, and the natural course of the fæces was restored. Under these circumstances, that portion of the cylinder of the intestine which had been lost, was most probably reproduced by the adhesion of the inner side of the sac to the intestine.

Case.

On the 29th of November, 1818, I was sent for by Mr. Pugh, to see — Henderson, at Mr. Carter's, Lombard Street, with strangulated hernia, which had resisted all the usual means of reduction, and he consented to submit to the operation. Having divided the stricture, which I found at the upper ring, I proceeded to draw the omentum down gently, but found it firmly embracing the intestine, so that it was obliged to be cut. The intestine was much changed in colour, but appeared to recover somewhat of its natural hue after division of the stricture. In half an hour after the operation he had stools : and he went on well for the three next days, when inflammation of the peritoneum began to shew itself, and he was bled by Mr. Pugh to twenty-eight ounces. On Sunday, the 5th of December, he was much troubled with hiccup, which on the following day was relieved by the application of a blister, and the administration of calomel and opium. On the fourteenth, fifteen days after the operation, fæces passed from the wound ; on the sixteenth about a table spoonful of feculent matter was found among the dressings. This feculent discharge continued without intermission for a fortnight, at which time the discharge began to diminish, and in three weeks it had wholly ceased. The wound soon closed, and he speedily recovered.

Case.

I operated upon a man, sent up by Mr. Butler of Woolwich, in Guy's Hospital, for a strangulated inguinal hernia, in whom the intestine appeared of a dark colour, but not in a gangrenous state, which I therefore replaced in the abdomen at the mouth of the sac. In five days after the operation, fæces made their appearance, and continued to pass for three days, at the end of which time they ceased to pass by the wound, and took their usual course. This man became convalescent in the usual period ; but just as the wound was cicatrised he was seized with erysipelas, under which he sunk in a few days. The body was inspected by Mr. Key. The portion of the intestine strangulated was the ileum, about eighteen inches from the colon ; it had contracted a firm adhesion to the upper and outer side of the mouth of the sac, and by this adhesion the breach in the intestine had been repaired ; for on slitting up the intestine the aperture through which the fæces had passed could be distinctly traced, the breach in the gut being filled by the peritoneal lining of the parietes, which had contracted adhesion to the gut, and was but little changed in appearance.

Case.

The intestine, however, is frequently gangrenous when the operation is performed, and the surgeon, as he cannot return it into the abdomen, is to consider in what manner he is to proceed, in order to save the life of his patient. The appearance which the gangrenous intestine puts on is very different from that of simple strangulation ; instead of being of a chocolate brown colour, it assumes a dark purple, and in the parts, where sphacelus is complete, spots of a leaden colour or greenish hue may be perceived ; the intestine also loses its lustre

Appearance of gangrene.

in consequence of a film of brown adhesive matter effused over its surface, or from an incipient disorganization of its peritoneal covering.*

Treatment of.

When the intestine presents these characters of gangrene, detaching the intestine from its adhesions and returning it into the abdomen would necessarily doom the patient to a speedy death, either from faecal effusion into the abdominal cavity, or from the continuance of the symptoms and effects of strangulation. The principle upon which he should proceed, is one applicable to almost all cases of gangrene. Having ascertained that the intestine is unfit to be returned, he should, in the most careful manner, divide the stricture, without detaching the adherent intestine from the mouth of the sac more than is necessary; the division of the stricture may be objected to, on the grounds of not disturbing the adhesions which the intestine has contracted to the neck of the sac. But the omission of this step might obstruct the passage of the faeces, and would cause the whole of the prolapsed bowel to become gangrenous, and by a timely release a large portion of the intestine may be enabled to resume its healthy functions; to prevent then the extension of gangrene, and to afford a free passage for the faeces, I recommend the stricture to be divided.† The operator should then proceed to make a free incision into the whole extent of the mortified portion of gut, and endeavour to evacuate the contents, not only of the gangrened intestine, but also of the canal above the stricture; neglecting this important step would render the operation unavailing to the patient; for, if the sphacelated portion of gut were left unopened, his powers might prove unequal to the effort of throwing off the slough in time to save life. The propriety of returning the gut to the mouth of the sac will depend upon the extent of the adhesions which it has contracted,

* The changes which the intestine undergoes, as a consequence of a stricture around the cylinder, may be comprised under three states. First, the state of simple congestion, in which the veins of the intestine are loaded with blood, but are still distinct, and the texture of the gut has undergone no change. This denotes a very early stage of strangulation, and is rarely met with in practice, as the disease has generally made considerable progress before the operation is performed. If the stricture remains, the vessels of the gut become less distinct in consequence of the capillary veins partaking of the distention, and the whole surface of the intestine assumes the chocolate or claret colour, which is heightened by blood being effused under the peritoneal covering. This latter is the most frequent appearance which the gut has presented in the cases in which I have performed the operation. The former appearance I witnessed in the case of a young woman, on whom Mr. Travers performed the operation after the strangulation had existed only a few hours, and whose recovery was proportionally rapid.

The second state is one in which evidences of active inflammation attend the strangulation. This state is characterized by the florid colour of the gut, and an effusion of fluid into the cellular texture, which so thickens the parietes as to render its return difficult, even after the stricture is divided. The coats feel thick and dense between the fingers, and the muscular fibres appear unusually distinct and large. These appearances indicate the continuance of arterial circulation, with difficult transmission of blood through the returning veins; and although the texture of the gut appears in these instances to have undergone considerable alteration, yet I am inclined to believe that this condition is one from which the intestine speedily recovers when released from the stricture, if the inflammation has not spread to the abdomen. I have seen two instances of this, both of which did well. One occurred under the care of the late Mr. Henry Cline, the other under Mr. Lucas at Guy's Hospital. Sometimes the inflammation is confined to the peritoneal covering, which secretes a layer of adhesive matter and becomes glued to the sac; this is one of the most common forms under which the intestine presents itself after strangulation.

The third state is that which immediately precedes, or denotes the actual presence of, gangrene; in both cases the organization is so far destroyed as to render a recovery of its functional power impossible. The appearance of the intestine varies according to the process which has accompanied its loss of life, as we find it does when occurring in the common integuments of the body. Sphacelus of the skin is usually distinguished by a dark colour approaching to black, in consequence of the blood effused under the cuticle in the form of vesications. But if, in the earlier stage of the process, the cuticle becomes abraded, as it often does in burns, the dead cutis, deprived of its circulating fluid, assumes a light ashen or yellowish colour. From the same cause we meet with mortified intestine under two appearances; one in which the surface of the gut has lost its polish, and appears of a dark hue, while its coats readily give way under slight pressure; the other, in which no blood having been effused between its tunics, the gangrenous spot assumes a greenish or ashen colour, surrounded often by a distinct line of separation.—ED.

† When the intestine is mortified, the practice of dividing the stricture has been by some writers represented as being not only useless, but even dangerous, from the risk of detaching the adhesions of the gut, and consequent faecal effusion into the abdomen. Mr. Travers expresses himself thus: "The object of a division of the stricture when an intestine is mortified, is to me unintelligible. It is, in fact, no longer a stricture; the resistance which rendered it so is taken off by the collapse of the included gut, and the patient can experience no greater relief from the division than the part itself. Nature has anticipated the surgeon; being unable to dilate the stricture she has accommodated herself, as the custom is, to the circumstances of the case, and accomplished by other means the object of the operation. The gut has been liberated at the expense of its vitality."—*Travers' Enquiries*.—p. 300.

Mr. Lawrence coincides with Mr. Travers in condemning this practice: "The manner of dividing the stricture, which is simply unnecessary in reference to the state of the stricture, is absolutely injurious, because it cannot be done without destroying the adhesion more or less extensively."

Leaving the stricture undivided, in every instance of mortified intestine, would, I apprehend, in some cases, defeat the object of the operation, namely, the evacuation of the loaded bowel. Experience undoubtedly teaches us that the mere incision into the gut is frequently sufficient to accomplish this object, and to provide for a ready exit for the faecal matters, as they accumulate in the ventral portion of the intestine. But we occasionally find the strictured aperture so small as to prevent the free egress of the faeces, in which case the inflammation of the intestine continues from its loaded state, and from the disturbance occasioned by the after attempts of the surgeon to procure an outlet for its contents. The following case illustrates the necessity of providing, at the time of the operation, a free opening in the constricted gut for the discharge of its contents; here, although the stricture was somewhat divided, the operator was afterwards compelled twice to free the obstructed opening of the intestine. Dr. Lush has favoured me with the following particulars of the case. A man was brought from Woolwich to Saint Thomas's Hospital, January 4th, 1822, with a strangulated inguinal hernia, which had been attempted to be reduced by the usual means; these having failed, the operation was performed. The coverings of the tumour were thin, denoting a recent hernia. The sac was formed by the tunica vaginalis; and as soon as it was opened faecal matter escaped from an opening in the intestine of about an inch in diameter. The intestine being examined was evidently gangrenous, and a part of the cylinder was removed with some attached omentum. The stricture formed by both rings was tight and extensive; the upper part of which was partially divided so as to admit the extremity of the finger within the intestine. On the Sunday following the remainder of the knuckle of intestine was removed, and the finger could be passed easily into the upper and lower portions. On the Monday a small quantity of feculent matter was discharged by the wound. On the Wednesday, the operator not thinking the aperture sufficiently free for the discharge, the stricture was farther divided; and from this time the patient began to sink from exhaustion, and died at eight o'clock on the following Sunday. On examination, the intestines were found in many places inflamed with adhesion of several folds. The intestine strictured was the ileum, eighteen inches from the cæcum; the two divided ends of which were in tolerable apposition. The lower portion had been entirely separated from the mouth of the sac; the upper portion had been only partially detached. The bowels above the stricture were extremely distended, while those below it were much contracted. The testicle was much altered in structure.

The danger of separating the adhesions, at the time of the operation, is, I think, exaggerated; a director may be passed between the intestine and the stricture without extensively separating them; and even if they be slightly detached, there is not more danger of faecal effusion than when the intestine is opened and returned to the mouth of the sac; a practice which experience fully authorises.—ED.

and upon this point I am guided by the following circumstances. If the gangrene is confined to a small spot, and the adhesion of the intestine neither firm nor extensive, I replace the intestine within the abdomen, except the gangrenous spot, which I leave at the upper part of the sac; and in this step of the operation will be seen the advantage of not carrying the incision of the integuments very high. The gangrenous part should be placed so as to be protected by a portion of the undivided integuments, which very much diminishes the chance of an artificial anus; the integuments assist the intestine in uniting by granulation with the surrounding parts; and the fæcal discharge subsides sooner than if the aperture in the bowel is left exposed. When the adhesions to the sac are very extensive, and the sphacelus includes a large portion of the bowel, the detaching the adhesions, and returning the bowel, might be followed by effusion into the abdomen. The adhesions are the result of a healthy process; they form a barrier round the sphacelated portion of bowel, to prevent fæcal effusion when the slough is cast off. In such a case the adherent intestine should be left in the sac, after a free incision has been made into its parietes. The after treatment consists in the application of fomentation and poultice; sutures should not be used, but every encouragement given to the escape of the fæces as they issue from the gut. Rest and the horizontal position should be strictly enjoined; for, entire dependance being placed on a process of union between the intestine and orifice of the sac, displacement may readily occur, and abdominal effusion would be the consequence. A descent of the gut might also ensue, which would render the cure of the artificial anus a work of difficulty. The following case occurred to me in the year 1808.

Ann Tenant, aged thirty-four years, was sent to Saint Thomas's Hospital on Tuesday the 17th of May, 1808, (by Messrs. Browne and Bungey, surgeons, at Rotherhithe) labouring under symptoms of strangulated hernia, and was immediately admitted as a patient to Mr. Chandler. Case.

An erysipelatous inflammation appeared in the left groin, under which there was a small tumour, seated on the outer side of the tuberosity of the pubis, and immediately below the crural arch; and as this was attended with constipation of the bowels, and with frequent vomitings, it was concluded that the disease was a femoral hernia in a strangulated state. The symptoms of strangulation had commenced on the 13th. Her strength was much reduced, and she stated that she was three months gone with child.

I was requested to see this patient at twenty minutes after one on the day of her admission; and at ten minutes before three o'clock, in consequence of Mr. Chandler's absence, I performed the following operation:

An incision was made upon the tumour in the form of a T reversed; and as soon as the integuments were divided, the sac and its coverings appeared in so sloughy a state, that there was no necessity for using the knife; they were easily torn open and turned aside by the finger, and the intestine became exposed in a completely gangrenous state. I then divided the stricture in a line towards the umbilicus, that is, upwards and inwards; and, placing a basin under the intestine, I made an incision into it of about an inch and a half in length, and thus discharged not only the contents of the protruded portion of bowel, but emptied the intestine within the abdomen. A poultice was then applied, and the patient returned to her bed.

Immediately after the operation, her pulse was at 48; but in two hours it arose to 70, at which time her sickness had ceased, and she no longer complained of pain at the scrobiculus cordis.

At eight in the evening her pulse was 100, and full; she had a considerable discharge of fæces from the artificial anus; the abdomen had ceased to be tender, and she was much disposed to sleep.

May the 18th, one p. m.—About midnight she was again attacked with pain in the scrobiculus cordis, vomiting and hiccough; and the abdomen had become tense and painful; her pulse was 105 and irregular, and she frequently ejected air from her stomach; the skin about the wound was much inflamed.

19th. The pulse was 100; the vomiting and sickness had declined; the wound was less inflamed.

20th. Pulse still irregular, but the countenance was natural, and the vomiting and hiccough had entirely ceased; she had slept for five hours last night; the discharge by the artificial anus was free.

21st. The pulse and discharge as yesterday. Her diet, which had hitherto been barley-water, tea and toast, was now changed to wine, jellies, and puddings, by Mr. Chandler's direction.

22d. The mortified portion of the intestine was sloughing away.

23d. The mortified portion of intestine had sloughed away, and the wound looked clean.

25th. She passed flatus by the rectum, and was at three o'clock in the morning attacked with violent pain at the scrobiculus cordis, but it ceased in a few hours.

26th. She had a discharge of hardened fæces by the rectum.

28th. She had a second discharge of hardened fæces per rectum; the discharge from the artificial anus still free; her pulse about 70, and regular.

29th. She had a discharge of dry fæces by the rectum, another on the 1st of June, and a fifth on the 2d.

June 3d. She had great pain about the umbilicus last night, and a profuse discharge from the artificial anus.

4th. A discharge of fæces by the rectum.

7th. The wound in the inguen diminishes; but a profuse discharge continuing from the artificial anus, she was ordered some opium, which succeeded in checking it.

On the evening of the 11th she had a free evacuation by the rectum; another on the 15th, and on the 18th. For four or five days previous to the 18th, she was allowed the common food of the hospital.

20th. The wound in the groin was very much diminished, and on the 21st a truss was applied for three hours; but its pressure occasioning some pain, it was removed; but was ordered to be reapplied after the force of its spring had been diminished.

26th. She was dressed, and sitting by the side of her bed. She has had no discharge from the artificial anus since the 23d; but not being able to bear the truss, even in its altered state, a piece of lint was applied upon the wound, and a long roller over it.

The *fæces* after this time took generally their natural course; but she sometimes had a feculent discharge from the wound, which irritated the surrounding skin, and rendered it necessary frequently to wash the part with a solution of fuller's earth.

She was discharged from the hospital on the 14th of July, 1808, a few days after which she applied the truss; and in three weeks from her dismissal the wound had completely healed, and never afterwards opened.

On the 23d of October, 1808, she was brought to bed of a full grown child, which was born dead, and much deformed in its lower extremities.

In about five weeks after her delivery she again became pregnant, and in a month afterwards miscarried; from that time she has continued well in every respect, and only wears the truss when exposed to unusual fatigue.

Mr. Dalrymple has communicated to me the following account of a case of gangrened intestine, which he confined at the edge of the wound by ligature. The patient recovered with an artificial anus. The detail is given by Mr. Utting, of Stratton, Norfolk, and dated January 20th, 1817.

Case.

Thomas Tibenham, husbandman, of Tritton, near Long Stratton in Norfolk, aged forty years, of a thin, spare make, healthy and active, had long observed a swelling in his right groin (perhaps as long as he could remember), which occasionally became painful without any evident cause, only that latterly this pain in the tumour had occurred more frequently than heretofore. At length, on the 19th of August, 1810, I was called in and found him vomiting. The rupture being hard, painful (indeed he had pain all over his belly), and had passed no stool for about eighteen hours, I tried to reduce it, bled him freely, gave both purges and clysters, but all without effect. Next morning the symptoms were advancing, though not very hastily; I now tried the tobacco clyster, which produced syncope, when I again failed to reduce the rupture, although this state seemed so very favourable to the attempt. Seeing the symptoms still upon the advance, under all these disagreeable circumstances, I ordered artificial cold to be applied, according to the method of Mr. Cooper; and sent for Mr. Dalrymple, who performed the operation on the 21st of August, when it was found to be a congenital hernia. I need not describe the state of the gut, etc., etc., having only to observe that the stools even at first never passed freely per anum, nor indeed without the help of clysters; that such was and is the slow passage of the *fæces* towards the rectum, that ten or twelve days frequently pass away before enough are collected there to require expulsion, which is always effected by clyster, the *fæces* so expelled being the size and shape of the rectum, as if cast in that mould, while the artificial anus pours out its contents daily and sometimes hourly in the most uncertain way, as now and then he is not oftener called upon than other men, while at other times he is afflicted with such a perpetual diarrhoea as nothing but opium and entire rest will restrain. With a view to excite the healing process, I have often jagged the edges of the wound with a lancet, and applied a truss to hold in the *fæces*, but all to no good or useful purpose. I saw poor Tibenham to-day; the wound is pursed up with rugous edges, unequally formed, and awkwardly resembling the verge of the anus, surrounded with an inflamed skin, sprinkled over here and there with erysipelatous ulcers, which, by cleanliness and occasionally anointing with lard or mutton fat, are prevented from growing deeper. He is obliged to refuse all fluid nourishment in a forenoon, breakfasting upon boiled rice, boiled peas, or bread, by which, as he expresses himself, a plug is placed in the wound, so that at dinner he can retain half a pint of beer or water (never more), which otherwise would pass off at the opening almost as soon as swallowed. He says that three months elapsed last summer without any stool per anum, so that he began to hope the expense and trouble of clysters would have been spared, when all of a sudden the desire of going to stool seized him, his efforts producing a copious sweat, and after the clyster a vast quantity of *fæces*. Notwithstanding this perpetual state of suffering, he is able to thresh in a barn some hours every day; is not much emaciated, though greatly dispirited. I have since learnt that he lived for five years, and gradually sunk from exhaustion.

The comparative results of operations, in which the intestine has been returned unopened into the abdomen, and those in which the bowel has been opened and unloaded by the operator, are well illustrated in the following cases, that occurred in the practice of Mr. Borrett, of Yarmouth.

Cases.

The first case was a Mrs. Rice, of Bradwell, who had strangulated femoral hernia (a patient of Mr. John Smith, of Gorlestone), and was operated upon August 6th, 1808. The bowel was found in a bad state, very much discoloured, and it was deemed not proper to return it into the abdomen; it was secured by the mesentery to the edge of the wound, and left to form an artificial anus; the symptoms of strangulation were relieved, but on the third day of the operation the patient was seized with vomiting of feculent matter, which continued until the fourteenth, when she sank from exhaustion. The practice of opening the sphacelating intestine was not then known to me, and I believe was afterwards described and recommended by Sir Astley Cooper.

Richard Bygrave, sadler, on the quay, Yarmouth, whom Sir Astley must recollect, died from incarcerated congenital hernia of sixteen hours strangulation. I operated upon him October 12th, 1818; the intestine in his case looked badly and black, but upon pressure upon the intestine he vomited, and it was the opinion of the gentlemen present, that it ought to be returned into the body at so short a period of strangulation—it was so. The vomiting continued, and he died twenty-four hours after the operation. I am strongly inclined to believe from later experience, that had the bowel been opened in this case, he would have recovered. This man had a good constitution, and had recovered his eye sight from couching him, 1814, only about four years before.

The next case was a patient in Yarmouth, whose name I am not at liberty to state, on whom I operated, 1820. The bowel was in a black sphacelated state. I opened the bowel as Sir A. Cooper had recommended, and she recovered. In course of time, say twelve months, the artificial anus was very much closed, and the *fæces* began to take their natural course through the rectum, and by the pressure of a gentle and well regulated truss, the *fæces* all took their natural course through the bowel, and the artificial anus closed.

The next case was a poor woman, Elizabeth Juby, aged fifty-one, with incarcerated femoral hernia, upon whom I operated, March 23rd, 1825. The ileum was quite sphacelated, and in the operation gave way in part, which I opened freely to the extent diseased. The *fæces* passed soon through the wound, and she recovered to a certain degree, but never was able to move about, for the food she

took passed through the artificial anus so rapidly, that she was not nourished by it; she might be said to have died starved in about five months after the operation, owing to the ileum being engaged in the hernia.

A case might occur in which I should be inclined to deviate from the above practice. If the sphacelated spot were very small and were surrounded by a healthy state of bowel, I would replace the intestine at the mouth of the sac, and place the sac over the gangrened spot, in order that adhesion might ensue between them, and the slough fall into the intestinal canal. This might possibly prevent an artificial anus; but the circumstances warranting such treatment must necessarily be of very unfrequent occurrence.

In my last edition I recommended that a ligature should be passed through the mesentery to confine the intestine to the mouth of the sac; this is unnecessary, as the intestine retains its position, and quickly contracts adhesion without the aid of such contrivance. I also practised gastroraphy and there recommended it, in consequence Gastroraphy.

As far as a judgment can be formed from these experiments, it will be seen that this operation is in them both Experiments. safe and effectual; for I have made the experiment of dividing the intestine and afterwards sewing its extremities together, and found it succeed. That I might have an opportunity of shewing the united intestine, during my lecture on wounds of the intestine, I made the following experiment for that purpose, in which I was assisted by Mr. Phillips, at that time a pupil of our hospitals, now Dr. Phillips.

EXPERIMENT.

The abdomen of a dog being opened, one of the small intestines was divided; a cylinder of isinglass was then introduced into the bowel, and three sutures were made upon it: one at the part at which it joins with the mesentery, and the other two on each side of the intestine. In three days the animal had regular stools. On the sixteenth day he was killed, and the united portion of the intestine was shown to the students.

EXPERIMENT.

It appeared in the foregoing experiment that the animal derived no advantage from the cylinder of isinglass, as it became shut by the contraction of the intestine. I therefore divided the intestine of another dog, and sewed it with three threads, without including the isinglass. On the second day the dog took food, on the third appeared playful, on the fifth I pulled the ligatures away; after which he suffered nothing from the experiment. I have had an engraving made of the portion of the intestine, and it is included in the second part of this work.

In both these experiments the intestine was returned into the abdomen, where it rested against the wound in the parietes; and the ligatures were left hanging externally. But my friend, Dr. Thomson, lecturer at Edinburgh, made these experiments in a different manner, and their result is so curious as to deserve attention.

EXPERIMENT.

Assisted by his friends Drs. Farre and Jones, he divided the intestine of a dog. The cut edges were sewn together, first by an interrupted suture going round the cylinder of the intestine, and then four other stitches were introduced at nearly equal distances from each other. The ligatures being cut close to the intestine he returned it into the abdomen, and sewed the external incision. No swelling or tension succeeded. The dog was killed on the tenth day. On opening the abdomen he found a portion of intestine, thickened and more vascular than usual, adhering to the parietes at the site of the external wound; on slitting this up he could see distinctly on the inside, but not on the out, the place at which the intestine had been divided. Three of the ligatures had disappeared, but the place of their former attachment could be distinctly seen on the inner and thickened surface of the wound. Two of the threads still remained adhering to the side of the wound. Pleased to find that the ligatures had passed from the outer to the inner side of the intestine, and that they had been discharged by stool, he determined to repeat the experiment, and to give a longer time to learn the result of it more completely.

Dr. Thomson's experiments.

EXPERIMENT.

In a full grown dog the first experiment was repeated, five stitches only being put in the intestine. The dog was killed at the end of six weeks.

On opening the abdomen he could see no distinct mark of division in the intestinal canal; but upon cutting out a piece and everting it, he found two stitches still adhering to its inner side. He could also perceive, as in the former case, but less distinctly, the marks made by the stitches which had disappeared.

It appears then, by these experiments, that in the animals which were the subject of them, not only the intestine may be returned into the cavity of the abdomen, but the ligatures which are applied upon it; and that no apprehension need be entertained of these ligatures being separated into the cavity to produce the inflammatory effects of extraneous bodies.

There is a curious difference in the facility with which a longitudinal and transverse wound of the intestine unite. It has been already shown, that the transverse heal readily; but with respect to the longitudinal, they

have a contrary tendency. Dr. Thomson, whose name I have already mentioned, made the following experiments, the result of which will be found extremely curious.

EXPERIMENT.

Dr. Thomson's
experiments.

Exposing the intestine of a dog, he made an incision into it of an inch and a half in length, in a line opposite to, and parallel with the mesentery. The cut edges were brought together by four stitches, which were cut away close to the knots by which they were tied, and the intestine was returned into the belly.

The dog became uneasy in the evening, and continued so the next day. The belly became tense, and he shewed an aversion to food; and in less than forty-eight hours he died.

Upon opening the abdomen strong marks of peritoneal inflammation were apparent, and a quantity of fluid was found consisting in part of exudation from the inflamed surface, and in part of the contents of the intestinal canal. The edges of the wound were torn open. One of the stitches had disappeared, but the three others remained, each adhering to one side of the wound.

EXPERIMENT.

He repeated the foregoing experiment, and, to prevent the escape of the fæces, sewed up the interstices between the interrupted stitches with a fine thread. This dog, like the former, soon became uneasy and restless; the belly became tense, and he died in less than forty-eight hours from the experiment. The appearances, upon opening the abdomen, were the same as in the former experiment. The circular marginal fibres of the intestine had torn open the wound, and had detached the continued as well as the interrupted stitches.

This experiment, although it produces a greater degree of constitutional irritation than sewing the intestine after a complete division of it, does not always destroy the animal, as the following experiment proves.

EXPERIMENT.

Saturday, January 14, I made a longitudinal incision of one inch and a half into the small intestine of a dog, and then having sewed the edges of the wound together with great care by an uninterrupted suture, I cut off the ligature close to the intestine, and returned it into the abdomen. In twenty-four hours after this experiment the animal was so ill as to make his recovery doubtful; but in forty-eight hours he was much better, and able to take food. From that time he recovered quickly, running about the house, and taking whatever was offered to him. On the seventh day I killed him, and found upon examining the abdomen, the intestines glued together so as to prevent my seeing the ligature upon the outer side of the intestine; but upon cutting them open, I found the thread loosely adhering to the edges of the wound, but the knot which I had made upon the outside was hanging on the inner side of the bowel. The intestine was uninfamed upon its internal surface, and the lacteals were loaded with chyle. Although this animal did not die from the experiment, it was certainly in greater danger, and suffered more, than in that in which the intestine was divided, and it requires much greater care to perfectly close the longitudinal wound than is necessary in the transverse.

The following experiments were made by Mr. Travers, to ascertain the effect of partial apposition of the edges of a divided intestine.

EXPERIMENT.

Mr. Travers'
experiments.

He divided the small intestine of a dog, which had been for some hours fasting, and carried a fine stitch through the everted edges at the point opposite to their connexion with the mesentery. The gut was then allowed to slip back, and the wound was closed. The animal survived only a few hours.

Examination:—The peritoneum appeared highly inflamed. Adhesions were formed among the neighbouring folds, and lymph was deposited in masses upon the sides of the wounded gut; this presented two large orifices. Among the viscera was found a quantity of bilious fluid, and some extraneous substances.

Finding that by the edges of the gut receding the fæcal matters escaped into the cavity of the abdomen, in the next

EXPERIMENT.

He increased the number of points of contact, by placing three single stitches upon a divided intestine, cutting away the threads and returning the gut. The animal refused food, and died on the afternoon of the second day.

Examination:—Similar marks of inflammation presented themselves. The omentum was partially wrapped around the wound, but one of the spaces between the sutures was uncovered, and from this the intestinal fluids had escaped. On cautiously raising the adhering omentum, the remaining stitches came into view. Here again the retraction was considerable, and the intervening elliptical aperture proportionally large. On the side next to the peritoneum, however, the edges were in contact, and adhered so as to unite the sections at an angle.

EXPERIMENT.

This gentleman also gave the experiment of Mr. John Bell a fair trial, of making a transverse incision into the intestines of two dogs, which was secured by one stitch, and fastened to the wound. One dog died in twenty-four hours. The marks of inflammation were very great, and the fæces had been discharged into the abdomen. The second dog died on the fourth day. The intestine appeared

very much inflamed; fæces, as in the other instance, were found in the abdomen; also water which the animal had drank. The large intestine appeared gangrenous, and tore very easily.—*Travers' Enquiries*, p. 116.

These experiments are quite conclusive against the practice of partially bringing the edges of the intestine in apposition, even in the brute; and the extension of the principle to the human subject requires no comment.

The above experiments prove with what safety ligatures may be placed on the intestinal canal of the inferior class of animals, and how little, comparatively, they suffer from the temporary obstruction to the passage of the fæces. Subsequent experience, however, has convinced me that such practice is inapplicable to the human subject; for the danger arising from the retention of the fæces, when ligatures are used, together with the uncertainty of their effecting the union of the extremities of the intestine, is an evil which more than counterbalances the chance of preventing by their use the formation of an artificial anus. My late friend, Dr. Cheston, of Gloucester, whose superior talents and extensive information are too generally known to require any panegyric from me, has given me the particulars of the following case, in which ligatures were used. Their inutility is demonstrated, as also the risk of obstructing the passage of the contents of the intestine. This case also shews a curious fact respecting the absorbent function of the intestine.

In the month of July, 1794, I was called to a young man twenty-two years of age, who had, for six days, laboured under a strangulated hernia of the right groin; the symptoms of which had been for five days so mild, that they had not excited sufficient alarm at his danger. Dr. Cheston's case.

In the state in which I then found him, of constant sickness, tight belly, extreme soreness of the tumour, without any evacuation per anum for the above-mentioned period, I could not but consider him in the most imminent danger, and therefore urged the necessity of an operation, without any further delay. Mr. Nayler, one of the surgeons of our County Hospital, was then sent for to perform it, and proceeding with that caution which an experienced and dexterous operator ever does on such occasions, he divided the sac, which he found without any fluid whatever, closely embracing a considerable portion of the ilium, which, with the sac, was in a gangrenous state.

On endeavouring to separate, in the most tender manner, the gut from its adhesions, it unfortunately burst, and its contents immediately escaped. Perceiving, however, the intended separation, and having at last effected it so as to draw out the whole of the diseased part, with a sufficient portion of the mesentery, near four inches of the intestine were found so completely destroyed as to require removal; which, with that of the gangrenous portion of the sac, was accordingly done, under such further intentions as circumstances must warrant, as most likely to serve the patient in this most deplorable situation.

The first thought which occurred, was the truly pitiable state to which the patient would be reduced in the event of his recovery, by having an artificial anus. Desiring, therefore, if possible, to avoid such a composition for existence, we agreed to bring the gut together by the usual recommendation of gastraphy. This being effected, and to guard against any ill consequences on the failure of the intention, from a retraction of the intestine into the cavity of the abdomen, two stitches were passed through the mesentery on each side of the divided intestine, and secured to the parietes of the wound. In this manner the operation was finished, and the patient being properly dressed was removed to his bed, when an emollient clyster was thrown up, and cloths moistened with spirits applied over the abdomen. He was ordered an opiate, and directed to take food sparingly of the lightest kind.

As the patient lived fifteen miles from Gloucester, he was left under the immediate care of his attending surgeon, an able and experienced practitioner, to act as circumstances might require; at the same time it was proposed, that Mr. Nayler should visit him again on the morrow evening.

On his arrival he found the young man by no means benefited by the operation. No evacuations had passed by stool, his belly was rather more distended, he was equally sick as before, and now and then teased with hiccough. In this alarming state Mr. Nayler thought it necessary to remove the dressing for the inspection of the part, when observing the wound to bear a very unhealthy aspect, he thought it necessary to remove the stitches on the intestine, bringing its open extremities just without the edges of the wound, to allow of an easy discharge of air or fæces contained in the superior part of the canal.*

In the course of the night, when he appeared almost expiring, a sudden and violent discharge of air and fæces burst forth from the wound in immense quantity, to his immediate relief. His pulse rose, a comfortable warmth succeeded, his stomach became settled, and his hiccough left him; in short, every prospect brightened, and from that day each symptom became more promising.

On the tenth day the parts looked so well and healthy, that Mr. Nayler, hoping there was still a possibility of diverting this most loathsome evacuation from the groin into its natural channel, by another attempt to procure an union of the divided portion, once more brought the extremities together by suture. Unfortunately this likewise failed in the extent proposed, most of the stitches giving way to the continual pressure to which they were exposed.

One advantage, however, and that eventually a material one, was thereby gained, an union being effected at the sides of the intestine, so that the sections there consolidated formed an appearance very similar to that of a double-barrelled gun. Notwithstanding this partial union of the intestines, the fæces still continued to pass wholly through the wound, till the patient accidentally having made a slight pressure upon the part, he soon afterwards felt a sort of natural inclination for a stool, which, encouraging by the usual efforts, he passed off to his great joy.

It instantly occurred to him, that probably a similar pressure, by compress and bandage, might assist him in future, so as to gain the power of a natural discharge.

* Query:—Might it not be proper, upon any such occasion, to allow some time for the escape of any accumulation above the divided part?

This expedient most fortunately answered, and I received the greatest pleasure by the information from Mr. Nayler that he had a daily discharge of fæces and wind per anum, and that he was now become so expert in the application of his bandage, that he could prevent any escape of fæces by the wound, however liquid they might be.

As it now became desirable to assist him with some better and more manageable contrivance, he was accordingly supplied with a truss, whose pad fully made the desired pressure, and completely answered the purpose.

From the time of the operation the wound underwent very considerable changes. At first, from the patient's being quiet in bed making little or no exertion of the abdominal muscles, it remained on a level with the surface of the integuments; but when he began to give his body more motion, the wound sunk inwards, or became deeper, and the extremities of the intestine returned likewise; so that they appeared at the bottom of a sulcus, forming near half a cylinder of a full inch in diameter.

He was now enabled to move about as usual, to take greater liberties in his exercises and amusements, to walk about his grounds, or get on his horse, without any restraint or inconvenience whatever. In this state having a call to London, I wished him to meet me there, as well to shew his case to Mr. Cline and Dr. Babington, as that he might derive any assistance from their well-known abilities. The result, however, of this meeting, was their surprise at his extraordinary and unfortunate state, and an acknowledgment that they knew no plan more promising than that he was then following.

At this time the appearances of the part were singularly curious. The upper portion of the intestine, in its action of protruding its contents, shewed that approximation of its internal surface which may have been frequently observed in the expulsion from the rectum of a horse of the last remaining fæces; but which was, in this instance, thrown forward with such a degree of projectile force as to clear the edge of the upper portion of intestine, whilst the inferior mouth was in that kind of relaxation or diastole as to form a temporary cavity for its reception and absorption; when immediately closing again, nothing more was seen of what it had received; so regularly and promptly did these divided parts continue to act, and most probably perform their functions, according to their original powers and peristaltic motion.

The above process was, however, only to be seen when the supply from the upper portion of the gut was rather scanty; for when (which was frequently to be observed) an increased quantity of fæces was brought forward, which the inferior portion could not receive, some, consequently, overflowed; but the manner in which it went on under cover, proved the assistance it received either from pressure, or the formation of an artificial canal.

M. Ramdohr's
proposal.

Under a complete division of the intestine it has been recommended by M. Ramdohr to put the upper extremity of the intestine within the lower, and to confine it there by ligature; but besides the difficulty of knowing in a hernia which is the upper and which the lower part of the intestine, I find, by experiments on living animals, that it is impracticable.

EXPERIMENT.

Some years ago I divided the intestine of a dog, with a view of trying to introduce the one intestine within the other; but I had no sooner made the division than the intestine became everted, and so bulbous at each extremity, that I found it impossible to pass one within the other; and that this also takes place in the human subject, is proved by a preparation of wounded intestine in the Museum at Saint Thomas's Hospital, taken from a man who had been kicked by a horse. The jejunum was ruptured, and it appears everted.

Large lateral
opening.

If the intestine has a large opening in its side, occupying one half of its cylinder, it is, if left to nature, sure to produce an artificial anus. Sufficient of the intestine is not then remaining to conduct the fæces in their proper channel. The wound heals so as to form an orifice sufficiently large to permit the escape of that portion of the fæces which the intestine cannot convey, and if it heals further than to that point, abscesses frequently form, which when they burst, discharge with the matter a considerable quantity of fæces. This is evinced by the case of a Mrs. S—, in Duke Street, Smithfield, whom I have frequently attended on account of a hernia of the ventral kind, from which a portion of intestine has sloughed. The wound has since several times healed; but at the interval of a month, and sometimes of six weeks, an abscess forms, and produces a discharge of purulent and feculent matter for four or five days, when the wound again closes; and in this way she has been teased for many years.*

Eversion
prevented.

When the mortified parts have sloughed, if any part of the fæces pass by the natural aperture, it is proper to guard against the eversion of the intestine at the artificial anus, as the consequence of that eversion is to establish the false passage, and prevent all hopes of the patient having a cure performed. The following case of inguinal hernia will illustrate this position.

* A ligature on the mesentery to retain the intestine within the neck of the sac, is not only useless, but, if Scarpa's views of the subject be correct, positively injurious, by having a tendency to perpetuate an artificial anus. This opinion he supports by observing the different results of wounds of the intestine, attended with protrusion and gangrened intestine accompanying a hernia. The former, he observes, are often followed by an incurable fistula, which, in the case of a hernia, is a much less frequent occurrence, in consequence of the retraction of the neck of the hernial sac and intestine within the abdomen,—a circumstance which he has often observed in the inspection of the bodies of those who have undergone the operation. In such cases the intestine is not found where the operator had placed it, namely, at the mouth of the hernial sac; but it is observed to have retired behind the tendinous margin of the stricture. This retraction of the sac with the adherent intestine is of essential importance in the conveyance of the fæces through the natural channel, and preventing an artificial anus being established. The acuteness of the angle in the intestine is then diminished; the consequent valvular projection of the mesenteric portion of the gut is much decreased; and the membranous funnel, which supplies the place of the gangrenous intestine, is drawn up, and therefore less liable to form a dépôt for feculent matter.—Ep.

A patient of Mr. Cowell's, in Saint Thomas's Hospital, who had long had an irreducible omental hernia on the right side, had a second protrusion forming a distinct tumour on the outer side of the old hernia. This last became strangulated, and the operation was performed, when the protruded intestine was found mortified, and was therefore left in the hernial sac. Case.

For three weeks after the operation the fæces were discharged in part from the wound, and in part by the anus, but most by the latter. In a month after the operation the intestine began to protrude at the wound, and became everted, and from that time the fæces ceased to take their natural course by the rectum. This man lived eleven years, discharging his fæces by the protruded intestine at the groin. He died in the year 1778, and when his body was examined it was discovered that a part of the colon, opposite the entrance of the ileum, and the ileum itself had sloughed away, but the adhesions of the intestines to the orifice of the wound, and to each other, had prevented any of the fæces escaping into the cavity of the abdomen, and whilst the ileum was preserved from protrusion, the fæces escaped in part from it into the colon, and were discharged by the rectum, and in part passed out at the artificial anus; but when a protrusion of the ileum happened, its communication with the colon was stopped, and the fæces were then all discharged at the wound. To prevent this occurrence in future, it is proper, during the progress of the healing of the wound, to support the intestine and prevent its eversion, for this circumstance will otherwise establish an artificial anus in every case in which a lateral opening of the intestine exists. (*See eversion of intestine in coloured plate.*)

The degree of danger which attends an artificial anus depends upon the vicinity of the sphacelated intestine to the stomach, for if the opening is in the jejunum, so little space is left for the absorption of the chyle that the patient dies from inanition. Danger of the artificial anus.

A man, aged fifty years, was admitted into Guy's Hospital for an umbilical hernia, the surface of which was red and very painful to the touch. He did not vomit, but no stools could be procured. The tumour was ordered to be fomented and poulticed; its surface became black, and the skin having sloughed exposed a portion of gangrenous intestine, which also separated. During the period of sphacelation the man's pulse was feeble, his countenance generally flushed, and he seemed to be sinking under the disease; but when the intestine had sloughed his strength seemed to recover, and great hopes were entertained that he would ultimately do well. However, when he began to take food in any considerable quantity, a part of what he ate was observed in half an hour to be discharged at the artificial anus. What he drank came away in less than ten minutes, and although he ate and drank a sufficient quantity to support a healthy person, yet he wasted rapidly, and died in three weeks after the tumour first began to slough. Case.

Upon examination of the abdomen, there was no effusion into the cavity, nor did the intestines appear inflamed. The jejunum being traced downwards was found proceeding through the umbilicus, and there it opened into the hernial sac, the aperture being situated in the lower part of this intestine.

When the artificial anus is in the ileum, it is attended with less danger than in the jejunum. If it is situated in the large intestines, patients scarcely appear to suffer in their general health, for I have seen several instances of this disease in the colon, all of them in women, and from umbilical or ventral hernia; and they seemed to possess the same bodily health with others, some of them being afterwards extremely corpulent.

When the artificial anus is completely established, all that can be done is to lessen as much as possible the offensive state of the patient, by confining the fæces until it is convenient to discharge them. For this purpose a square cushion, covered with oil silk, is to be placed over the artificial anus, and a steel truss, which exerts but a slight degree of pressure, being placed upon it confines the fæces so as to lessen the offensive smell, and allows the patient to seek a convenient situation for an evacuation. This plan answers extremely well if the feculent matter has some consistence, but if the aperture is in the ileum the contents of this intestine are with difficulty confined, as the patient cannot bear the requisite degree of pressure. Treatment of artificial anus.

If the wound in the integuments is small, and the intestine has more than half its cylinder, it would naturally be supposed easy to unite it, and cases of success are related; but in the instances in which I have known it attempted, it has not been attended with success. In a former part of this work, I mentioned an instance of a boy who had an artificial anus in the scrotum, produced by swallowing a pin, which made its way from the hernia through the scrotum. In this lad the edges of the wound were pared and brought together by suture, but still they did not shew any disposition to unite, and no advantage was derived from the operation.

I also attended a lady who had an umbilical hernia, which had sloughed and left a small fistulous orifice, which Mr. Cruickshank endeavoured to unite, by passing stitches through the wound after paring its edges; but this attempt brought on, in four days, such symptoms of pain and tension of the abdomen, with constipation of the bowels, that he withdrew the threads, and a very large quantity of feculent matter issued, by the discharge of which she became immediately relieved.

The probability of the restoration of the fæces to their natural passage, after an artificial anus has once existed, will depend on the loss which the cylinder of intestine has sustained. When a small portion of the cylinder has been destroyed by gangrene, the cases given above shew how quickly the breach may be repaired, and the fæces take their usual course by natural efforts; in one case the fæces resumed their natural course in three weeks from the date of their appearance at the wound; in another case they only passed three days by the artificial anus; and in a third the aperture closed, after remaining open during a period of three months. But when the whole

cylinder of the intestine has sloughed away, the difficulties of the case are increased by circumstances which I will point out, and the chance of relieving the patient from a loathsome condition becomes very much diminished.

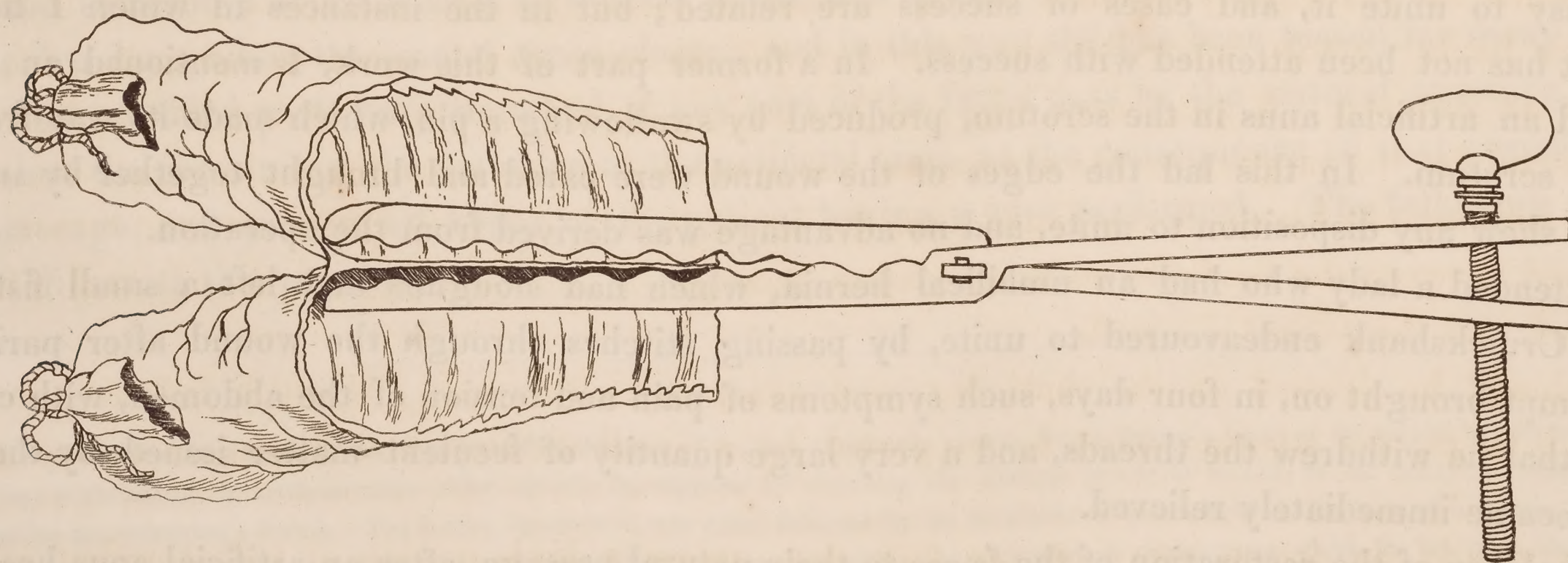
When a complete portion of the cylinder has been lost, and the two truncated ends of the intestine are replaced at the orifice of the sac, they assume a nearly parallel position, and in this posture they contract adhesions to each other by their peritoneal surfaces, and also to the contiguous peritoneum at the mouth of the sac. The angle which is thus formed impedes the passage of fæces from the ventral portion of the intestine into the anal portion, and thus offers an obstacle to the reestablishment of the canal by natural efforts. An additional impediment to a free passage exists in the valvular fold of intestine, formed by the adhesion of the two portions of gut, which forms a sort of septum between the two canals, and prevents any immediate communication between their extremities.

I have already mentioned a case in which the edges of the wound were pared, and brought together in order to close an artificial anus, without success; nor is this practice at all likely to succeed, except when only a very small portion of the coats of the intestine is lost; in which case nature is herself generally equal to the cure. To assist the closure of an artificial anus, it is of importance to prevent constipation, and it not unfrequently happens, that after a brisk purgative has been given, the fæces will take their natural course by the rectum, and the artificial opening begin to close. This fortunate termination I have witnessed in my own practice, and Scarpa has also mentioned a similar result following the action of purgative medicines.

When the fæcal fistula is caused by a small breach in the parietes of the intestine, and nature shews no disposition to close it, I should have recourse to the same operation as I have found succeed in cases of urinary fistula. The canal of the urethra and intestine resemble each other, both in their structure and office; they are both excrementitious outlets, composed of a mucous lining, and under the influence of muscular contraction; and from this analogy there is strong reason to conclude, that an operation which succeeds in closing a fistula in the one, would also answer in the other. The edges of the opening in the integuments having been pared off, a portion of integument should be raised from the neighbouring surface, leaving a neck of attachment undivided, and be laid over the opening, to the edges of which it should be united by small silk ligatures. As a preliminary step it would be advisable to evacuate the bowels by purgatives and enemata, in order that they may be called into action as little as possible during the process of union.

M. Dupuytren, to whom I feel greatly indebted for various acts of kindness and much information, when I visited Paris in 1825, has suggested an ingenious mode of remedying this defect, when combined with a loss of the entire cylinder. It consists of a pair of screw forceps, one blade of which is passed into each mouth of the intestine, and a degree of pressure is kept up on the intervening septum, sufficient to produce ulceration, and thus open a communication between the parallel canals. It does not, however, appear from the cases related by this able surgeon, that it succeeds in all cases in wholly closing the artificial opening; but it obtains for the patient an exchange of an artificial anus for a fæcal fistula; the fæces pass by their natural channel, while a small fistula remains, from which a fluid discharge continues to ooze.*

* For an account of this instrument see Graefe and Walter's Berlin Journal for 1821, in a review of a work by Breschet; also Reisinger's work, Ausburgh, 1817. This sketch of the instrument is taken from the former work.—Ed.



CHAPTER XII.

Of the Treatment after the Return of the Protruded Parts.

WHEN the operator has returned the protruded contents of the hernial sac, he should clear it of any blood which it may contain; and, having nicely adjusted the sac and its coverings, bring the edges of the wound together, confining them by sutures. The needle and ligature should be passed through the integuments only, and great care should be taken to avoid penetrating the sac, which might occasion a dangerous extension of the inflammation. A piece of lint should then be laid on the wound, with a compress of linen over it, and these pressed pretty firmly down upon the groin by the T bandage, so as to close the orifice of the hernial sac. Dressings.

The patient is then to be carried to bed in an horizontal posture, and whilst this is doing, the surgeon should support the wounded part with the palm of his hand, to prevent the intestine from being forced down by the motion of the patient.

It is usual, immediately after the operation, when the patient is laid on his bed, to give him a dose of opium, with a view of procuring him sleep after his sufferings; but when a person has been for many hours in violent pain, with constant vomiting and perpetual watchfulness, a sudden removal of his sufferings will generally be followed in a few minutes by profound sleep, without the use of opium; and this medicine becomes, in this case, not only useless, but positively detrimental, as it occasions a torpor of the bowels, and prevents their ready evacuation. The patient, if left to himself, will have natural stools in two or three hours after being put to bed, unless the parts have suffered a very high degree of inflammation; but this will always happen much later after opium has been given; and its use is therefore to be avoided, if possible, since the patient is never completely relieved till the bowels are unloaded. Opium.

If three hours elapse without an evacuation, a purgative clyster should be given, composed of *magnesiae sulphas*, *infusum sennae*, and a large quantity of liquid, as warm as the patient can bear it. If this does not succeed, they may be followed by the *oleum ricini*, or two drachms of sulphate of magnesia in mint water; but no purgatives should be used, till it appears probable that stools cannot be procured without them. Spirituous fomentations to the abdomen will assist the natural action of the bowels. Purges.

It sometimes happens that the vomiting continues for some time after the operation, notwithstanding the patient has had stools. This arises from an extreme irritability of the stomach which still remains, and under these circumstances opium becomes absolutely necessary to remove it. Vomiting.

In like manner opium sometimes is required to remove a troublesome cough, which comes on after the operation; it both prevents the patient from taking rest, and endangers a return of the protrusion by the sudden pressure on the abdominal contents. Cough.

The patient must be particularly enjoined on no account to move from the horizontal posture during cure, particularly whilst having stools, otherwise the intestine will be very liable again to descend. Of this the following case is an instance. A gentleman, who had just undergone the operation, having had no injunction as to posture, was found by his surgeon on the evening of the same day sitting upon the night-chair, and straining violently. On examining the hernia, it was found that the intestine had not only forced its way again into the sac, but had passed between the ligatures so as to project through its interstices beyond the external wound. It was again returned, and the patient did well. Horizontal posture preserved.

The wound should be dressed on the third day, and every day afterwards. If much inflammation comes on, or the hernia is large, the scrotum must be supported by a small cushion, and fomentations and poultices applied.

The ligatures should be drawn away on the fifth day, unless a high degree of inflammation renders it necessary to remove them earlier. After this the cure proceeds as in a common wound; but the patient should be kept in bed till it is complete. Sutures withdrawn.

If the operation has not been too long postponed, the patient's recovery is generally regularly progressive; but if much time has elapsed, various dangerous symptoms arise.

First. The intestine sometimes does not recover its function, the vomiting and constipation continue, and the patient falls a victim to the disease.*

Secondly. If inflammation continues in the peritoneum, and the abdomen remains tense and sore although stools can be procured, the disease proceeds until the patient dies; and upon examination the intestines are found glued together and greatly distended with flatus. This state must be prevented by bleeding, fomentation, leeches to the abdomen, and purges.

Thirdly. A violent purging sometimes succeeds, and continues for many days, which exhausts the patient's strength so as to prevent his recovery. Under these circumstances, small and repeated doses of opium, with clysters of starch and opium, and feeding the patient with isinglass and milk, is the practice I have known to answer best in stopping this disease.

Fourthly. In a very irritable person tetanus will sometimes occur when every other circumstance appears favourable. This happened in a case of Mr. Spry's, surgeon, in Aldersgate Street.

He operated upon a man of the name of Ashby, aged fifty years, who had a hernia which became strangulated on the 23rd of December, 1803, and which resisted every attempt to reduce it, made by himself and by Dr. Yelloly. On the 25th the operation was performed in the most satisfactory manner. By the eighth day after the operation the wound was healed, excepting at one small spot; but upon the morning of that day he complained of stiffness and soreness about the neck, with a difficulty in swallowing, and the jaw became soon completely locked. Opium and the cold bath were tried with some slight temporary abatement of the symptoms, but without any permanent advantage, and the man soon fell a victim to the disease.†

* The unsuccessful issue of cases, in which the operation of dividing the stricture and releasing the intestine is not followed by any alleviation of the symptoms, is generally considered, by our best writers on the subject, to arise from the inability of the constricted portion of gut to resume its peristaltic function; and no doubt *post mortum* examinations have been the grounds on which such an opinion is entertained. I confess, however, that my own experience has inclined me to assign a different cause for this want of reaction on the part of the intestinal tube; and the distinction is one not unimportant in practice. Were paralysis of the constricted portion of intestine the cause of evacuations not being obtained after the return of the bowel, we should expect to find this passive condition of the gut marked by a state of external tension, from an accumulation of fæces; or the contents of the upper bowel would be propelled into this inert portion of tube, and there collecting would form an impassable barrier to any further passage. Examinations, however, demonstrate no such condition of gut: the strictured portion is not in a state of distention, but is in the same state as when returned by the operator. The feculent matter is found still remaining in the intestine above the stricture, which is distended with flatus and fluid, and exhibits all the usual traces of high inflammation. It is this inflammatory state of the upper part of the intestine that accounts for the want of evacuation per anum; the muscular fibre under a state of inflammation does not contract; the canal therefore yields to distention from within, and the removal of the stricture, although it preserves the vitality of the strictured bowel, fails to unload the upper part of intestine. The only mode of relief would be the application of leeches on the abdomen, and continued doses of calomel combined with opium; this medicine has considerable influence over inflammation of serous membranes, allays the irritability of the stomach, and is more likely to recall the healthy action of the intestine than common purgatives, which irritate without producing the desired effect. The assistance of clysters is desirable, to induce the lower portion of bowel to act, in order to excite a disposition to peristaltic action in the upper portion as the inflammation subsides.—ED.

† There is one consequence attending the operation for strangulated hernia, which has received little or no notice, even among the best and most experienced writers on this important subject. The circumstance I allude to is suppurative inflammation of the hernial sac. The symptoms attending it are so severe in their character, and so much resemble those attending strangulation of the gut or omentum, that the danger of confounding the two states is alone sufficient to arrest attention.

In ordinary cases of operation for strangulated scrotal hernia, where every thing goes on well, the scrotum remains tender, and a slight purulent discharge continues until the whole surface has either adhered or granulated; the sickness and constipation cease, the hiccup is speedily abated, and the symptoms of general depression soon subside. In some cases, on the contrary, the scrotum becomes tumid and painful in a day or two after the operation, the hiccup and vomiting recur, the bowels become torpid in their action, or entirely obstructed, and the surgeon is led to believe that the intestine has returned through the abdominal ring into the sac; this idea is strengthened by the feeling of the patient, who describes the sac as being full, and giving him the same sensation as when his rupture was down.

Impressed with this view of the case, the surgeon is naturally enough disposed to open the sac, with a view to return the prolapsed contents; an operation that in all probability would be fatal to the patient.

I believe from my own experience, and from the observation of others whose opportunities have been greater, that a prolapse of the intestine after being returned by a careful operator is a very rare occurrence; and perhaps it will not be saying too much to affirm, that it hardly ever happens except under violent efforts in the erect posture, as for instance, when a patient rises from his bed to use the night-chair, and puts the abdominal muscles in violent action. The enlarged and tender state of the scrotum is produced by an inflammatory effusion of adhesive matter into the sac prior to suppuration being established. This law, though uniformly adhered to in inflammation of all serous membranes, is peculiarly salutary in a hernial sac by preventing the pus, which is afterwards secreted, from passing into the abdomen. The effusion of adhesive matter reaching as high as the internal abdominal ring, gives to the swelling the form of a hernial tumour, and to the patient the sensation of his rupture having descended. The returned intestine lying at the mouth of the sac, assists in forming the barrier between the sac and abdominal cavity, and thus becoming involved in an active inflammatory process, produces the symptoms of abdominal irritation, which bear so dangerous an aspect. If the surgeon opens the sac to ascertain whether the intestine has descended, and, not content with a superficial examination, passes his finger round the neck of the sac, he causes a disturbance in nature's process that no treatment can afterwards repair. By destroying the adhesions of the intestine he either produces a continuous inflammation along the peritoneal surface, before circumscribed by the adhesion of the gut, or affords an opening for the escape of the afterformed pus into the abdominal cavity.

I have, in the last chapter, mentioned a case of a surgeon, who suspecting from the urgency of symptoms that the stricture had not been sufficiently divided at the time of the operation, on the fifth day opened the sac, examined with his finger the state of the internal ring, and had a second time recourse to his bistoury to dilate the opening;—a practice highly fraught with danger, and speedily followed by the sinking of the patient.

The two following cases will illustrate the extreme irritation produced by the suppurative process, and the similarity of the symptoms to those of strangulation; inasmuch, that in the case which fell under my own care, I was strongly urged by bystanders to open the sac, and return what was supposed to have protruded; and in the other case, which occurred under the late Mr. Chandler, the sac was opened, but, fortunately for the patient, judiciously closed without exploring the state of the parts at its neck.

For the following case I am indebted to Mr. South, who allowed me to add to my own outline of the case additional particulars from his notes.

Joseph Hurst, aged thirty, admitted into Luke's Ward, Saint Thomas's Hospital, September 6th, 1817. Has been the subject of inguinal hernia on the right side during the last two years, which has been gradually increasing in size during that time. He never recollects having used any violent exertion, and thinks that it was caused by weakness; he is positive that he could always return the whole tumour, by lying on his back, till last Thursday evening, the 4th, since which time he has had no stools. He was bled this evening before his admission to about sixteen ounces, at nine o'clock. The symptoms were not very urgent, but he complained of much pain in the part, probably owing to the attempts at reduction. Numerous fruitless attempts were made, and he was then put into the warm bath, and bled again to twenty ounces, under which he became very faint, but on recovering had severe spasms of the upper extremities; no advantage was obtained here, but it was a curious circumstance, that when pressed upon a gurgling noise was heard, and the contents of the intestine readily returned; yet the hernia itself could by no means be returned; and as soon as the finger was taken off, the tumour became as

When the patient has recovered from the operation, he is still, as before, exposed to a descent of the hernia; and more indeed than at first, as the division by the knife must have enlarged the aperture into the abdomen. I had lately under my care in Guy's Hospital, a man who twenty years before was the subject of operation for

large as ever, about the size of one's fist. When the intestine was emptied of its contents, and the tumour shaken, a sound was heard as if there were a large quantity of fluid in the sac itself. After remaining in the bath half an hour, he was sent to bed, and hot flannels ordered to be applied to the abdomen.

September 7th. Has not slept during the night, but does not suffer much pain; his pulse is much the same as last night. At nine o'clock Mr. Chandler saw him, and ordered him to the bath again, in which he remained about half an hour without any advantage. About eleven o'clock a tobacco enema was thrown up, but without effect. About one o'clock the freezing mixture was applied, and continued for five hours; he thought himself rather better. In the evening a common enema was thrown up, composed of castor oil and infusion of senna, but did not operate.

September 8th. Had a very slight evacuation this morning. About ten o'clock he was ordered small doses of sulphas magnesiae, and in the course of the day had some more stools. His abdomen was less tense, but had been all along slightly tender; he continued well during the following week, only complaining of occasional tightness at the scrobiculis cordis coming on in the evening, and going away towards the morning; his bowels are open.

September 16th. About noon he began to feel very uncomfortable, complaining of great pain and tension of the abdomen, which continued to increase; he has had one stool to-day; about half-past five he was much worse, and sixteen ounces of blood were then taken away, having just before that taken opii: grij:; he continued getting worse, and about eight o'clock was seized with severe vomiting and hiccough; his countenance was anxious, pulse quick and hard, abdomen tense and tender, and he evidently laboured under severe symptoms of strangulation. About half-past nine Mr. Chandler arrived and proceeded to the operation, at which time his pulse was at 160, but it was probably increased by bringing him up into the theatre. The operation was performed as usual, but on opening the sac at least two ounces of water escaped, which was probably what rattled when the tumour was shook. The prevention of the return of the intestine was also clearly demonstrated, for when it was raised the lower part was firmly adhering to the inner side of the sac, and which did not seem very recent, so that, notwithstanding the man being so positive of always having been able to return it, I have little doubt but that it existed some weeks irreducible. The intestine itself was very much distended with flatus, but its vessels did not shew any appearance of long strangulation. No stricture whatever seemed to exist, for when the intestine was emptied two fingers could be very readily passed through the internal ring into the abdomen, and the adhesions having been cut through the intestine was readily returned: there was no omentum in the sac. The reason of symptoms of strangulation supervening seemed to me to be this, that whenever he was attacked with much flatulency, the intestine in the sac was filled with flatus, and consequently a stricture was formed at the mouth of the sac so as to prevent the passage of the faeces through the incarcerated portion; this flatus might be readily passed out, but in consequence of the intestine being confined at the lower part of the sac, the flatus accumulated again and strangulation was again produced; it therefore became necessary to perform an operation in order to divide the adhesions, and the intestine was then readily returned. Three sutures were put in the wound, and some adhesive plaster applied over it. At eleven o'clock I saw him again; pulse 132 and softer; thinks himself easier.

September 17th. Passed an indifferent night, and had an involuntary evacuation. At eight o'clock this morning he began to take the solutio magnesiae sulphatis, which he repeated at ten; but at twelve, as he preferred it, he took $\frac{1}{2}$ oz. of ol: ricini, and had a stool some little while after; the adhesive plaster was removed, and simple dressings applied in its room. At three in the afternoon the ol: ricini was repeated, and before seven o'clock he had had a very copious evacuation. Between five and six his pulse was 130; his abdomen much more tense than in the morning, and extremely tender; about sixteen ounces of blood were withdrawn, and at seven he was certainly much better; his pulse was 112, and had got more volume; and his belly was less tender, though still very highly so; he began to take magnesiae sulphas one drachm in the haustus kali limoniati in a state of effervescence every two hours. At eleven pulse 130, but not so hard as in the evening; the blood is very much buffed and rather cupped.

September 18th. Slept but little during the night; pulse 120; abdomen less tender. About one o'clock I saw him; pulse 122; skin hot; tongue brown and dry; his abdomen not at all tense, and but very slightly tender; he has had three evacuations in the course of the morning, and is evidently better; the scrotum is much swelled, and the intestine seems to have come down again. At seven in the evening had two more copious stools; but the same appearance of tumour remained in the scrotum, and on account of this, by the discretionary power left with the dresser, the sutures were removed and the wound opened, but the hernia had not descended. The sutures were replaced, and an evaporating lotion of spirits of wine and liq: amm: acet: applied; took tinct: opii: gtt. xxx.

September 19th. Passed a good night, but has not had any stools before one o'clock p. m., at which time pulse 132; skin hot and dry; has but little pain on pressure of the abdomen. Seven o'clock p. m. pulse 104; has had several stools since one o'clock; skin rather perspirable; is quite free from pain; tinct: opii: repeated.

September 20th. Slept well; pulse 112; bowels open freely; his countenance has but little anxiety; skin moist; tongue cleaner. A few days after a puffiness appeared about the scrotum, and a poultice was applied which had the effect of accelerating the formation of matter, and on September 29th about six ounces of pus discharged.

September 30th. About three ounces more pus discharged; in the course of the following week this abscess healed up, but was followed by a smaller one, which was opened October 11th, and about two ounces of pus discharged.

October 31st. He is perfectly recovered.

During the treatment of the following case, after I had performed the operation, there was but little expectation of the patient's recovery, in consequence of the extreme urgency of the symptoms. I experienced great assistance from the able and judicious advice of Dr. Cholmeley, senior physician to the hospital, who was much interested in the result of the case. Mr. Elkington, surgeon at Birmingham, then dresser at the hospital, paid unremitting attention to the man, and, by keeping a very accurate account of the train of symptoms, has enabled me to give the following detail.

James Rogers, aged thirty-eight, was admitted, April 1st, into Job's Ward, Guy's Hospital, with a strangulated inguinal hernia on the right side. He had hernia for the first time about six months ago, which descended after forcibly exerting himself in raising some heavy weight; it was then easily returned, and did not come down again till the Saturday morning previous to his admission, when it again protruded in the same way as at first, and immediately became strangulated. At the time he was admitted he had pain and tension of the abdomen, constant nausea, with occasional vomiting, constipation, and a small oppressed pulse; he was much depressed, and complained of being very chilly. The sac was rather large, firm, and becoming somewhat tender. A vein in the arm was immediately opened, but owing to the depressed state which he was then in it bled very slowly; however, twelve ounces were taken from him, and he was not at all faint. He was then put in the warm bath, and the arm tied up again, which now bled freely, and sixteen or eighteen ounces more were drawn off. He became faint, was then taken out of the bath, and the Taxis tried for about half an hour, during which time he remained very faint. The neck of the sac felt very firm, and not the slightest impression could be made upon it; cold was applied, and the Taxis again tried for a short time, but with no better success. The symptoms increasing Mr. Key proposed the operation, to which the man consented. He was excessively irritable during the operation. The external pudic artery bled slightly, but did not require a ligature. The stricture was situated at the internal ring, and divided directly upwards. Six or eight inches of intestine were down, which was dark coloured, and in a state of high congestion; they were returned into the abdomen. The operation was performed early in the evening.

Tuesday morning, April 2nd. He has passed a good night; pulse 80, full and soft; has felt sick two or three times, but has not vomited; tongue slightly furred and moist; no pain or tenderness; no evacuation; enema stat: and cap: two drachms sulph: magnes: fifteen grains carb: magnes: o: quart: hor. Pulse 96; had one evacuation after the injection, and feels very comfortable.

Wednesday, the 3rd. Seven o'clock:—Passed a good night; felt sick once, but did not vomit; he has had slight hiccough three or four times, and no evacuation since yesterday morning; pulse 92, full and soft; slight pain in the right side on pressure; sac tender, and he is much troubled with flatus; enema stat: and in two hours to be repeated if necessary, and mist: sal: ap: contin. Twelve o'clock:—He has had two evacuations, and felt much relieved at the time, but soon afterwards he fancied the gut had again descended; he complained of pain in the abdomen; sickness, and occasionally slight hiccough, which symptoms came on rather suddenly. The abdomen is distended with air. The scrotum was examined, but it could not be ascertained that the intestine was come down again; and these symptoms went off again after a short time. Four o'clock:—Pain and tension of the abdomen; nausea and occasional singultus; two evacuations.

Thursday, the 4th. Twelve o'clock:—Has slept several hours; no pain in the abdomen, nor vomiting; hiccough pretty constant; pulse 100, soft and easily compressible; tongue furred and moist; skin moist; no evacuation since the last report; abdomen tympanitic. Three o'clock:—The sac is large and inflamed; the coverings of the testicle are also inflamed, forming two distinct swellings; his countenance is expressive of great anxiety; v: sect: ad sixteen ounces, calomel ten grains, h: s: and an enema with $\frac{1}{2}$ drachm extr: colocynth c: om: trihora. Nine o'clock:—Nocte; pulse fluttering and irregular; breathing laborious; hiccough; no pain, and the tension of the abdomen less; he has had four copious evacuations.

Truss necessary.

strangulated hernia, and he has now again this complaint on the same side. A truss must therefore be always applied after the cure, before the patient can be allowed to walk about and return to his usual occupation.

Case.

A man who lived opposite the gates of Saint Thomas's Hospital, had the operation of strangulated hernia performed on him many years ago, and on his cure the surgeon warned him of the necessity of wearing a truss to prevent future danger. But having neglected this caution, two years afterwards he was again seized with symptoms of strangulation; and, anxious to avoid the operation, he tried every means to reduce the hernia without effect, and at last he only sent for a surgeon when his approaching death made it useless to perform the operation. On opening his body, I found the hernia strangulated in the former sac.

The subject of the following account had undergone the operation many years before, but from some irregularity in diet, and neglect in wearing his truss, his intestine descended and became again strangulated. The history of his symptoms is well drawn up by Mr. Wagner, now surgeon in Charleston, U. S. at that time an intelligent and attentive pupil at our hospitals.

Case.

Samuel Dawson, sexton to Spitalfields Church, aged forty-two years, was admitted into Guy's Hospital by Mr. Samuel Harris, dresser to Mr. Lucas, on Sunday, six o'clock a. m., 28th of July, 1816, with symptoms of strangulated hernia.

The patient had been the subject of a strangulated hernia upon the right side about twenty years since, for which Mr. Lucas, senior, operated, and gave him relief. He has worn a truss since that time during the day, but always put it off in the night season; he has occasionally gone to business without it, but never continued it off longer than a day or two at one time. The truss had been laid aside on Saturday; he had eaten a hearty supper in the evening, and drank freely of beer the whole day; he was, however, very comfortable at ten o'clock that evening. He went to bed, and was seized with a violent pain in the abdomen across the umbilical region, and also at the lower part of the belly. He has had occasional attack of pain in the abdomen, with sickness and vomiting, since the

Friday morning. Passed a restless night; has had three evacuations; pulse 96 and pretty regular, only intermitting at each singultus, which takes place once in about every five or six beats; singultus distressing; sac tender and painful; no pain in the abdomen; thirty leeches to the scrotum, 3 gr. of calomel, and $\frac{1}{2}$ gr. of opium every four hours, with a purging draught. The leeches bled freely, and it was very difficult to stop the bleeding. The abdomen less tense. Nocte, ten o'clock. Pulse 100, soft and full; tongue furred; great thirst; singultus constant; sickness, and occasional vomiting; no pain. To continue the pills, and omit the draughts as they make him sick. Enema om: trihor: ut antea.

Saturday morning, the 6th. Pulse 86, full and soft; no pain; has had two copious evacuations; slept five hours; hiccough still constant, but less troublesome; abdomen much less distended; his countenance more natural, and he is perfectly quiet; continues pil: with infusion of sennæ, and mist: camphor: six drachms. Nocte. Pulse 96, full and soft; singultus constant; ol: ricini two drachms, statim.

Sunday, eleven o'clock. Purged five or six times; stools dark and offensive; pulse 90; tongue cleaner and moist; neither pain nor tension of the abdomen; sac less, and not at all tender; constant hiccough, and frequent vomiting. E. lyttæ ad epigastrium. Pulse 86, and intermitting; singultus and vomiting; three evacuations.

Monday morning, nine o'clock. Pulse 84, intermitting every five or six beats; constant hiccough and vomiting; passed a restless night; no evacuation; ordered beef tea, sago, and a little brandy. Two o'clock:—Pulse very irregular, both in force and frequency; singultus and vomiting. Omn: hera conf: opii: and hydr: cum creta ana three grains. Ten o'clock:—Nocte; pulse 90, irregular in force, but regular in frequency; singultus somewhat less.

Tuesday morning. Passed a good night; hiccough less, and he has not vomited since yesterday; pulse full and soft, only intermitting every ten beats; tongue moist; no evacuation; stat: s: ol: ricini six drachms. Nocte. He has had two or three motions in the bed; and is very much depressed by the purging; singultus worse; no vomiting; pulse 96, small and intermitting every five or six beats. Repetr: pulv: hydr: cum creta, etc.

Wednesday morning, twelve o'clock. Passed a very comfortable night; pulse 86, intermitting every ten beats; hiccough still very troublesome, but less violent and frequent; the sac is less, and the wound looks well. To continue the powders, beef tea, sago, etc. Ten o'clock:—Nocte; pulse 90, soft and regular; he has had one healthy and copious evacuation; singultus much less; tongue furred and brownish in the centre, yet moist; perfectly easy, and much inclined to dose.

Thursday morning. Pulse 86, regular, small and soft; passed a comfortable night, and two healthy evacuations; hiccough more frequent than last night, but still much better than it has been. Nocte: pulse 90, and quite regular; the hiccough is now very slight, and only returns at long intervals. He ate two eggs to day, and drank a little porter.

Friday. Passed a good night, and one motion; pulse 84, soft and full; no hiccough; ordered porter; he also ate a mutton chop, after which he had hiccough frequently during the day, but it had entirely ceased at night.

Saturday. Pulse 96; the hiccough has not returned; no evacuation by the rectum; about five ounces of pus have been discharged from the sac. Haust: purg: s.

Sunday. Better; sac discharges freely.

Monday. Better; bowels move regularly; the sac continues to discharge very freely.

Wednesday, the 17th. He continues to improve. Ordered decoction of bark and acid.

20th. Still improving.

22nd. Diarrhoea; pulse 90, small and depressed; the sac discharges very much. To omit the bark and acid, take conf: arom: and inf: cuspar.

23rd. Pulse 96; less purged; pus has collected at the bottom of the scrotum, and been evacuated by a small incision.

24th. Better; bowels move regularly; the lower opening discharges freely, the upper is nearly closed.

May 17th. He has progressively mended; a truss was adjusted to-day, and he got up for a few hours. The upper opening is completely closed, the lower nearly so; the scrotum and testicle have nearly acquired their original size; the lower part of the sac is apparently filled with adhesive matter, and forms a pretty hard swelling, situated a little above the testicle.

30th. Well; discharged June 19th. The truss was worn constantly for a month, it was then taken off to examine the part. The size of the sac was much diminished, and no fluctuation could be felt when the man coughed; it was reapplied.

I saw this man in June, 1825, and he continues free from any appearance of rupture, even when he lays aside his truss.

It is evident, therefore, that the apprehension of the gut prolapsing after an operation, is more founded on imagination than on experience. The descent of a hernia is not a process in which the intestines are the active agents. A combined action of the abdominal muscles and diaphragm is necessary; and by keeping the patient quiet in a recumbent posture, there exists little or no risk of such an occurrence, as the returned gut, being more or less inflamed on its surface, soon acquires adhesion to the surrounding parts. The treatment of the suppurative state of the sac must be entirely palliative; for though urgent, as regards its attending symptoms, it would seem not to be dangerous in its issue. In the early stage of the inflammation, leeches and evaporating lotions should be applied to the scrotum to diminish the violence of the adhesive stage, by which the constitutional symptoms will be in a considerable degree mitigated. As soon as evidence can be obtained of suppuration having taken place, which is evinced by the exquisite tenderness of one or two spots of the scrotum particularly near the external ring, poultice should be applied, and the edges of the wound preserved open to allow the escape of the pus. The thickness of the tunics will in general prevent a distinct sense of fluctuation being perceived; and the absence of this evidence, together with the apprehension of wounding the gut, (be it well or ill founded), will deter a surgeon from putting a lancet into the tumour.—ED.

operation which Mr. Lucas, senior, performed upon him, but they were of short duration, and were always relieved by a stool. He attempted to return the hernia which had come down in the morning, but without success. The pain of the abdomen and tumour of the scrotum increasing, surgical aid was called, and he was bled to 12 oz. at four o'clock a. m. Sunday. The time of the first attack was about half-past eleven on Saturday evening. He was not relieved by the bleeding, and he was brought into the house for farther aid.

Six o'clock a. m. The patient now complains of being very faint and cold; is very restless; is sick and vomits; has frequent eructations of air from the stomach; great pain at the lower part of the abdomen, and across the umbilical region; feels as if a stool would give immediate relief; is unable to pass any thing from the bowels, and has not had a stool since Friday; the pain and uneasiness is so great he is unable to lie still, changing position from lying to sitting up repeatedly; the tumour is on the right side, is very large, and the veins of the scrotum easily distinguished and turgid; there is great tenderness in the old cicatrix, so much indeed as to prevent a judicious use of the Taxis; pulse small and weak.

Fifteen minutes past seven o'clock, a. m. The patient was put into the warm bath, great faintness induced, and the Taxis attempted, but to no purpose. The tenderness in the groin was extreme; the pain in the abdomen was less; while in the bath the pulse rose and was fuller; was continued in the bath about twenty minutes; he expressed himself easier when returned to bed and laid quietly for a few minutes.

Eight o'clock. As the Taxis could not be used a cold application was now employed to the part. Mur: ammon: nit: potass: 5 oz. aq: 16 oz. cum spt: vin: $\frac{1}{2}$ oz.; this was applied to the strictured part, and to as much of the tumour as a large bladder which contained it would allow; patient complained during its continuance of intense and increased pain over the whole of the abdomen, extending up even to the scrobiculus cordis; it was desisted from after being used but five minutes; the patient said it was intolerably painful. Patient thinks he would be very much relieved could he discharge wind from the bowels; has vomited very lately, and is now sick; complains of great pain in the abdomen on pressure; is very restless.

Forty-five minutes past eight o'clock. Patient made some pressure of the tumour in his own way, and reduced it with a guggling noise, but is not much relieved; the pain in the abdomen still continued.

Nine o'clock. Pain in the abdomen considerable; sickness and vomiting continue to some extent; great faintness; is very cold and shivers; great tremors of the superior extremities; pulse quick and small; had no stool. Pil: cal: cum col: No. ij.

Eleven o'clock. No stool, but great inclination to evacuate the bowels; some sickness, with attempts to vomit; much pain in the abdomen, is as severe as before the reduction, especially on pressure; the abdomen is very tense and tender; pulse small, quick and tremulous, not very hard; great thirst, but unable to retain fluids in the stomach; countenance anxious, very pale and altered since he came out of the bath; skin warmer than at nine o'clock.

Fifteen minutes past twelve o'clock. Pulse extremely quick, small and tremulous; pain in the abdomen very great, and much increased on pressure; tension the same; had no stool; some sickness; tongue white and furred, with a tremulous motion when thrust out of the mouth; hands and feet cold and clammy; cold sweats over the body; in this state Mr. Forster ordered an enema; ol: ricini $\frac{1}{2}$ oz. mur: sodæ $\frac{1}{2}$ oz. aq: tepid: 8 oz. to take also ol: ricini $\frac{1}{2}$ oz. and to foment the abdomen.

Forty-five minutes past twelve o'clock. Pulse small, frequent, and somewhat hard; breathing rather oppressed; pain in the abdomen very great; patient very restless, and anxious for a stool, is convinced it would relieve him; frequent eructations of air; ordered to be bled, and guided by the pulse a vein in the arm was opened; the pulse rose, and was fuller and more distinct, but very frequent; about 8 oz. could only be taken away; the bleeding stopped, and the pulse immediately fell, and became small, feeble, and almost indistinct; from this state it did again recover, but gradually subsided until at last it could not be felt at the wrist at all.

One o'clock p. m. Patient extremely restless; extremities cold and clammy; the body in a profuse perspiration; abdomen more tense, but the pain subsided; pulse scarcely perceptible, very frequent and cannot be counted; sickness and vomiting ceased; enema came away, and with it small portions of feculent matter; and a little before one had another stool which was more copious; patient raised himself in bed, but fell back unable to support himself.

Fifteen minutes past one o'clock p. m. Patient died. The pain in the abdomen had abated quite, and the patient sunk away gradually and without a struggle; there was an interval, at one time, of a minute between each inspiration; there were slight but regular convulsive action of the muscles of the face; he was insensible a short time before death. Examination after death not allowed.

Hence it becomes absolutely necessary that the surgeon should see his patient fitted with a proper truss, to prevent him from future danger.

It is also proper that the patient should be confined to his bed until the wound is healed, that the adhesions which form in the sac may acquire considerable firmness before he exposes himself to the danger of a future descent; and he should not quit the horizontal posture without a truss, which must have a compress of linen under it, to prevent it injuring the recently healed wound.

As, therefore, the operation itself only removes the present disease, and does not effect a radical cure, some surgical writers, to accomplish this end, have proposed the cutting away or tying the hernial sac during the operation, or returning it into the cavity of the abdomen. To ascertain the effect of cutting away the sac, I took the following opportunity in a favourable case that occurred.

Sac removed.

A woman of the name of Bispham, a patient of Mr. Holt's, of Tottenham, had for many years a femoral hernia, which, in the summer of 1801, became very painful, without, however, interrupting the regular course of her bowels, and confined her to her bed on account of the extreme pain she felt upon attempting to put her leg to the ground. Having remained several days in this state, incapable of using any exertion for her maintenance, Mr. Holt requested me to see her. I made several fruitless attempts to reduce the hernia, and a week afterwards, as the pain and inability to move still continued, I advised the operation, which Mr. Holt performed. When he had opened the sac a minute portion of intestine was found just at the mouth of the sac, adhering to it firmly, and inflamed, but not gangrenous. It was so small a portion of the circumference of the intestine that the fæces were able to pass it, and therefore no constipation was produced

Case.

by this partial strangulation ; but it became painfully compressed at every attempt to extend the thigh, which was the cause of the inability to move. Mr. H. with great care separated the adhesions, and returned the intestine into the cavity of the abdomen. As the hernial sac was large, and had been considerably detached from the surrounding parts during the operation, I thought it would be a very favourable opportunity of trying what would be the effect of removing it, and requested Mr. Holt to permit me to do it. I dissected away the whole of the sac, which was easily done ; then passed stitches through its mouth so as to bring the edges into perfect contact. The ligatures were drawn out of the external wound, which was treated in the usual way. On the sixth day the ligatures came away, and the wound was healed on the tenth. A month afterwards I saw the woman, and was surprised to find that another hernia had formed on the same spot, which was already as large as that for which the operation had been performed. She came to request a truss, finding that on every attempt at exertion she felt a powerful forcing down in the tumour, which was also rapidly increasing in size. I saw her again two years afterwards, at which time, immediately on removing the truss, which had been worn ever since the operation, the hernia freely descended.

Does not succeed. It appears, therefore, that the removal of the sac will not prevent a return of the disease ; and, indeed, when it is recollected that the aperture from the abdomen continues of the same size after as before the operation, and that the peritoneum will still remain the only obstacle to the descent of the intestine, it does not appear probable that this highly extensible membrane should succeed in preventing a return of the same hernia, the first formation of which it was unable to resist.

Tying the sac. The plan of making a ligature round the mouth of the hernial sac has been also recommended, and in some instances adopted ; but it is liable to so many objections, particularly in the inguinal hernia, that it is never likely to come into general practice. The sole intention of this operation is gradually to cut away the sac, but I have just shown that this would be insufficient to produce a cure, could it even be done with perfect safety to the patient. But it cannot even be securely done, for,

First, the spermatic cord is often divided by the sac, so that one part of it passes behind, and the other before, or on the side of the sac. When this happens it would be extremely difficult, if not impossible, to conduct the operation in such a manner as to avoid injuring parts which should never be touched.

Secondly, this operation is founded on mistaken ideas of the hernial sac ; for a ligature applied as proposed, at the abdominal ring, if it cut through the sac, must leave a hernia above it, with a sac still open as before ; and the ligature cannot be employed to the part of the sac lying above the ring without splitting up the tendon of the external oblique muscle, which would take off so much of the natural support of the parts as almost certainly to allow of a future descent.

Thirdly, the danger of the operation is besides a principal objection. A ligature applied around a part of the peritoneum must inflame it ; and as this membrane is continued without interruption along the sac into the cavity of the abdomen, the inflammation will follow the same course, and expose the patient's life to hazard. Extended surfaces very readily propagate inflammation, as we see in the skin under erysipelas, or in the veins and absorbent vessels when inflamed ; but if the surface is broken by adhesion, the inflammation extends only to the adhering part, and there stops. Thus when a ligature is applied round the spermatic cord in the operation of removing the testicle, the inflammation thereby excited does not extend into the abdomen, because the tunica vaginalis of the cord is closed by adhesions. In animals, in whom that is not the case, the disease takes a more extensive range, as will be seen in the following example.

Analogous case. A surgeon, who thought he could castrate a horse much better than a farrier, who employs red-hot irons to burn off the spermatic cord and sear the vessels, persuaded a friend of his to allow him to operate on a fine young horse. He cut down upon the cord, made a ligature around it which stopped the bleeding, and proceeded to remove the testicle, as it is done in the human subject. However, in four days the animal died ; and on opening the body it was found that the inflammation produced by the ligature had extended along the tunica vaginalis (which in the horse is open to the abdomen) into the cavity of the belly, so that the animal died of peritoneal inflammation.

Petit has noticed the danger incurred by tying the hernial sac ; in one case the pain was so great after this operation, that he was obliged to cut away the ligature to check the inflammation which was spreading into the abdomen ; in another case where this practice was pursued, symptoms of strangulation came on, and the patient died. On inspecting the body the peritoneum was found inflamed, both where it lines the abdomen and where it covers the intestines.

Returning the sac. With respect to returning the sac into the abdomen, that is in a large hernia often impracticable, and the only use attending it will be in those cases in which adhesions to a great extent have taken place between the intestine and the hernial sac, when it will be more easy to return the intestine and sac with it, than to remove the adhesions ; but of this I shall treat farther in the chapter on small herniæ.

CHAPTER XIII.

Of Large Hernia.

WHEN an inguinal hernia is very large, and especially when, at the same time, there is reason to believe that the parts which it contains adhere to the inner side of the hernial sac, a different operation is required from that which has just been described as applicable to common circumstances; and for the following reasons.

Require a different treatment.

First, in very large old hernia, the cavity of the abdomen is so much diminished by the habitual loss of the protruded intestine and omentum, that it becomes scarcely able to receive them again; and, if a reduction is attempted, the force necessary to effect it endangers the bursting of the intestine.

This happened in a case that occurred at Saint Thomas's Hospital, an engraving of which is seen in plate 10, fig. 3. The hernia was very large, and the diminished size of the abdomen made it necessary to use great efforts in the reduction, during which the intestine burst, and the man died five days afterwards.

Secondly, a large surface of the intestine is exposed and handled for so long a time as to produce, even if it does not give way, the risk of an inflammation, which will probably be attended with fatal consequences.

Thirdly, even if by great pains the intestine be returned, it is scarcely possible to keep it in the now over-distended abdomen, so that the slightest cough or effort of any kind is sufficient to bring it again down into the sac, and thus to induce a high and dangerous inflammation.

Lastly, when great adhesion occurs, so much time is necessarily required in performing the operation to separate the united surfaces, that fears may be justly entertained of the patient not surviving the operation. It has been recommended, under these circumstances, to dissect the sac from the surrounding parts, and to return it into the cavity of the abdomen after the stricture has been removed; but although this operation is practicable in small hernia, it becomes extremely dangerous in one that is large, connected as it is with the spermatic cord, and sometimes splitting the vessels which compose it.

Hence, in these cases, I would advise only the division of the abdominal ring; or, if the stricture is higher up, of the lower edge of the transversalis muscle; but the hernial sac should not be opened, unless the stricture is situated in the sac itself.

Division of the stricture only.

The following case will shew the advantage of this practice in this variety of the disease.

Charles Beegey, aged fifty-four years, was admitted into Saint Thomas's Hospital on Friday, the 4th of February, 1803, for a strangulated hernia. He had been subject to the disease from his earliest years; it had been produced by a bruise on the pummel of a saddle, and had always been in a great degree reducible, but not entirely so; for whenever he had emptied the sac as much as he could, something might still be perceived to remain within it. On Monday, January 31st, it became painful whilst he was at work, and could not be in any degree reduced; and almost at the same moment he was seized with the sensation of colic, and with vomiting.

Case.

Tuesday, February 1st, all the symptoms were increased; he had had a small stool, but not more than could well be supposed to come from the large intestines below the stricture; which was the more probable, as it afforded him no relief. On Wednesday, Thursday, and Friday, the symptoms continued to increase, and he was then admitted into the hospital. Mr. Birch, whose patient he was, being absent, I was requested to see him.

The tumour was of an enormous size, reaching half way to the knees; it was hard, and painful on pressure. The abdomen was hard and tense, though but little painful. He was sick, and occasionally vomited, and had had no stool since Tuesday. Many attempts were made to reduce the hernia, but without success; and his situation was such as to leave no hopes of preserving his life but by an operation; but even this alternative appeared desperate, on considering his age, the size of the swelling, and the adhesion which its contents had contracted. To these discouraging circumstances was added the presence of an habitual cough, which would render it almost impossible to keep the parts in the abdomen when returned. I therefore resolved, before opening the sac, to ascertain whether it were practicable to perform the operation of cutting the ring and the parts above it, and returning the reducible portion without exposing it.

With this view I made an incision, three inches in length, immediately over the abdominal ring, exposing it with the knife, as well as the fascia which it sends off. I then made a hole in the fascia large enough to introduce a director, which I thrust up behind the abdominal ring, between it and the hernial sac; and passing a curved probe-pointed bistory upon it I divided the ring. I then introduced my finger, and feeling some resistance from the transversalis, I carried the bistory upon the director up to it, and divided this also. I was immediately gratified with finding that a slight pressure was now sufficient to return into the cavity of the abdomen all the protruded part, which did not adhere, and it went up with a gurgling noise as soon as my hand was laid upon the tumour. The man was soon relieved of his pain, and the edges of the wound being brought together, he was put to bed.

On visiting him about sixteen hours after the operation, I felt happy at having performed it in the manner above described, as I found him free from every symptom of strangulation, and scarcely suffering from the wound ; but what convinced me of the propriety of the practice which I had pursued, was to find that whenever he coughed the tumour again increased largely in size, and, though easily reducible, the intestine again descended at the next fit of coughing, nor could any endurable degree of pressure on the wound keep it supported. Although under these circumstances this descent was of no importance, yet if the sac had been opened the continual irritation kept upon its exposed contents, must probably have been followed with fatal consequences. As it was, he had no bad symptom; in a week he could bear the application of a laced truss, like that which I have described to be used for large irreducible hernia, and in three weeks the wound was perfectly healed.

The following unsuccessful case, in which an opposite practice was pursued, will equally illustrate the advantage of the plan above recommended.

Case. I was desired by Mr. Johnson, surgeon, of Swan Street, Minorities, to see a patient of his, a lady sixty-eight years of age, who had long suffered under an irreducible ventral hernia of enormous size, which was now strangulated. As various unsuccessful attempts had been made to return the parts, the operation was proposed, to which the patient consented. When the sac was opened, the omentum and intestine were found adhering both to it and to each other, so as to make a return of the protruded parts absolutely impracticable; and the sac itself was too large to allow of its being separated from the surrounding integuments and returned into the abdomen. I therefore had to regret that I had opened the sac. All that could be done was to dilate the stricture, and to bring the integuments closely together, confining them by sutures, so as to close the hernial sac. The symptoms of vomiting and pain in the abdomen immediately ceased, and she had a passage through the bowels. However, on the succeeding day inflammation took place in the integuments and hernial sac, the abdomen became very tender, and in thirty-seven hours after the operation she died.

If I had, in this case, performed the operation without dividing the sac, merely by dilating the stricture, the patient's life would probably have been saved.

In the year 1816, Mr. Carpenter, an intelligent pupil at our hospitals, for some years past practising as a surgeon at Ottery, Saint Mary, Devon, consulted me respecting a case of large hernia, on which he had operated, and was obliged to leave a large mass of intestine exposed in the sac. Mr. C. thus describes the case.

Case. A labouring man, nearly sixty years of age, sent for me attend him, and on my arrival I found him labouring under the symptoms of a strangulated hernia, which, from his account, appeared to have been irreducible for a number of years. It was the largest hernia I ever remember to have seen. I had recourse to the usual means of reduction, but failed in my attempts; and it became necessary to perform the operation to enable me to release the intestine, which I did in the presence of an experienced practitioner of this town, and Mr. Tucker, now resident at Exeter. On making an opening into the sac a large quantity of intestine suddenly protruded, with a small piece of omentum. Having divided the stricture, I endeavoured to return the intestine, but found the adhesions so extensive from the number of years it had been down, that it was judged advisable not to attempt their separation. From the size of the hernia it was quite impracticable to bring the integuments over the intestine, which was therefore left exposed in the sac. In this situation he was carried to bed, with a piece of lint laid over the bowel. Contrary to my expectations his symptoms soon began to subside, and he passed healthy evacuations. The lint which had been applied adhered to the intestine, which soon began to granulate; and I was pleased to find it gradually shrink within the sac, so that with the support of straps of adhesive plaster I was soon enabled to bring the integuments over the intestine. The wound speedily cicatrised, and in less than a month from the operation he returned to his usual occupation.

The termination of this case was singularly fortunate, considering the large portion of intestine that was left uncovered in the sac, and the consequent risk of peritoneal inflammation. It may be regarded as an exception to a general rule; for I believe that all surgeons of experience will concur in the frequency of fatal results, when large herniæ are the subjects of operation; and that the cause of such termination is the extensive inflammation and irritation excited by exposing so large a surface of intestine.

The late Dr. Monro, of Edinburgh, to whom it would be ingratitude not to acknowledge the obligation I feel for the instructions conveyed in his lectures, has strongly urged the propriety of dilating the abdominal ring without opening the sac, in hernia in general; and I feel convinced that this operation will be gradually introduced into general practice when it has been fairly tried, and found, if performed early, to be free from danger, and attended with no unusual difficulty.

Objections. It has been objected to this practice, that if there is a probability of the intestine being mortified, it does not afford the means of ascertaining it, or of relief, if this state of the bowel exists. This objection is certainly well founded, when, from the duration of the disease, there is reason to suspect this event to have happened; but still the operation in which the sac is not opened may be employed with safety, in those cases where the surgeon is convinced, from his general experience, that if a reduction by the tobacco clyster, or any simple means, could be brought about, the parts would resume their healthy functions.

It is also objected, that this operation would not apply to those cases in which the stricture is at the mouth of the sac, occasioned by a thickening of the sac itself. But to this I would answer, that this is not so frequent an occurrence in inguinal hernia as has been imagined, the stricture above the ring on the outer part of the sac

having been frequently mistaken for it, as I have explained in a former part of this work. But even if the stricture has arisen from a thickening of the sac, a division of the parts on the outside of the sac would expose the patient to no danger, and would even be necessary in dilating the part where the stricture existed.

Lastly, against the objection that, in case of adhesion of the contents of the sac, this operation would leave the patient with an irreducible hernia, I would contend that this very adhesion ought to be a strong inducement not to open the sac, on account of the great additional risk to life which such a proceeding would produce.*

CHAPTER XIV.

Of Small Inguinal Hernia.

HERNIE sometimes become strangulated when they are so small as to protrude no lower than within the space lying between the abdominal ring and the upper aperture at which the spermatic cord first quits the abdomen. An example of a hernia in this state will be seen in plate 3, 5 and 6.

Hernia between the ring and abdomen.

This hernia is covered with the tendon of the external oblique muscle: the spermatic cord, and the epigastric artery lie behind it; Poupart's ligament below it; and the edges of the internal oblique and transverse muscles, with the cremaster, extend above it in a semicircular direction. In short it is inclosed in the inguinal canal.

Its covering.

An attentive examination is requisite in the living subject to detect it, as it does not exhibit that detached circumscribed tumour which is produced by the hernia after it has passed the ring, but appears merely as a fulness above the ring and Poupart's ligament. When strangulated it is very sore on pressure, and coughing produces much pain. Before strangulation comes on, the patient is sensible of a weakness at the part under every exertion.

Difficult to detect.

This tumour occurs much more commonly than is usually supposed, for I have frequently found it in the dissection of bodies of persons who have never been suspected of labouring under the disease, nor have ever worn a truss. When strangulated these cases more commonly fall under the care of the physician than the surgeon; for, as the patient himself is often not conscious of having a tumour at the groin, the symptoms of strangulation are ascribed to inflammation of the bowels, and the patient dies, as is supposed, of idiopathic peritonitis.

Very frequent.

A man was admitted into Saint Thomas's Hospital with symptoms of strangulated hernia, which for five days had been treated as a case of simple inflammation of the bowels, without a suspicion of the true cause having been excited.

Case.

On examination, a fulness could be perceived above Poupart's ligament; and when this was compressed, a small tumour, like the end of the little finger, appeared at the abdominal ring, which again receded to its former place, on withdrawing the pressure. Pain was felt at the same time, and on coughing much uneasiness was produced at that spot.

As five days had elapsed between the first accession of the symptoms and his admission into the hospital, the performance of an operation afforded but little prospect of success; for, besides vomiting, he had been troubled with a hiccup for forty hours, his belly was sore on pressure, and his pulse so small as scarcely to be distinguishable. However, as it was the only possible chance for recovery, the operation was undertaken. On cutting down to the tumour, it was found to be produced by a hernial sac an inch and a half long, and when this was opened, about half the circumference of one of the small intestines was found to be contained within it, together with a quantity of sanious serum. The stricture, which existed an inch and a half above the abdominal ring, was then divided. The intestine was discoloured, but the point of the knife having accidentally touched one of its superficial veins, blood issued from it freely, proving that the bowel was in a fit state to be returned; which was accordingly done as soon as the bleeding ceased. The patient had stools in twelve hours, and, although he afterwards suffered from a severe purging, he ultimately recovered.

In this variety of hernia the operation should be performed in the following manner. The incision is to be begun over the tumour, half way between the symphysis pubis and the spinous process of the ilium, and extended downwards parallel to Poupart's ligament, as low as the abdominal ring. This incision, which only divides the integuments, exposes the tendon of the external oblique muscle, which being next cut through in the same direction, without cutting the abdominal ring, the hernial sac comes into view, extending from the abdominal ring to the opening at which the spermatic cord quits the abdomen. The sac is then to be opened in the manner described in a former chapter, and the intestine examined. A probe-pointed bistoury being then introduced behind

Operation for it.

* Some good observations on the advantages of returning the contents of the hernia, without opening the sac, are contained in vol. 10 of Edinburgh Journal, p. 290.

the stricture which is formed by the tendon of the transversalis; this is to be divided in an upward direction. In this case, however, it is of little consequence whether the stricture be divided straight upwards, or outwards and upwards, towards the ilium; as the epigastric artery, to avoid which the straight upward direction has been recommended in a former chapter, is necessarily in this species of hernia on the inner side of the hernial sac. But for the same reason a direction of the incision inwards or towards the pubes, must always be carefully avoided; and to prevent any doubt at the time of the operation, the incision upward at the middle of the mouth of the sac will be the most proper.

After this operation, as this part of the abdominal parietes is weakened by the division of the tendon, a truss must be put on as soon as possible.

It has been proposed to return into the abdomen the hernial sac, without opening it. For this purpose the stricture is first to be divided, the intestine and omentum returned from it if possible, and the sac is then to be pushed into the cavity of the abdomen.

Sac returned.

In a very small hernia this operation is practicable, because the sac has then contracted no strong adhesion to the surrounding parts, and it can be also readily done in the female; but if the hernia is comparatively large, it cannot be effected without much dissection, which in inguinal hernia in the male could not be always safely performed, on account of the frequent varieties in the course of the spermatic cord, the vessels of which in large herniæ are always more or less turned from their usual course.

As there would be often much difficulty in executing this part of the operation, it will be best to push back the contents only, without attempting to return the sac, as the patient is equally liable to a future protrusion, although the sac is returned, as the following case will prove.

Case.

Mr. Weld, jun., surgeon at Romford, was called on May the 24th last, to a woman of the name of Moore, in that place, who laboured under symptoms of strangulated hernia, proceeding from a tumour of this description at the abdominal ring. All attempts to reduce the hernia having failed of success, the operation was performed of cutting down upon the tumour, separating it from its adhesions, and dividing the stricture. The sac and its contents were then returned into the cavity of the abdomen, as there was no reason to suspect the existence of mortification. The wound healed in the space of a fortnight, and the woman recovered.

Objections.

This operation was so far completely successful, and did Mr. Weld great credit; but he has since written to inform me that the hernia has reappeared, as the woman would not wear a truss upon a part which was still tender from the operation. However, she experiences no inconvenience from it, as it can be now readily returned into the cavity of the abdomen. As it appears, therefore, that the return of the sac into the abdomen will not be attended with a radical cure, if there is any danger from the size of the tumour, or from the position of the spermatic vessels, it is an attempt which should not be made unless the intestine adheres, and it ought never to be done under any circumstances, unless the sac is first either emptied of its contents, or the stricture is clearly divided, as there is danger of the symptoms of strangulation continuing, if the mouth of the sac is contracted and is allowed to remain undilated.

Hernia behind the spermatic cord.

I shall conclude this chapter with an account of a highly interesting case, which has been sent to me by my friend Mr. Thomas Blizard, under whose care the patient was. The disease was a small hernia, which descended behind the spermatic cord, and the person also laboured under a hydrocele of the tunica vaginalis testis. The following is Mr. Blizard's account of the case.

Case.

A man was admitted into the London Hospital, who had been troubled with a bubonocoele of the right side upwards of six years, during which period he had almost constantly worn a truss. About two years ago a swelling took place in the testis of the same side, which he describes to have been similar to a swelling he now has on the left side, which is a hydrocele. That swelling in a few months gradually disappeared, and left the testis wasted and drawn up towards the groin. This is the man's account.

When first called to him I found a small bubonocoele of the right side, and could distinctly feel the testis of the same side, but very small, lying at the bottom of the hernia, having an inclination forwards. The means employed for reduction having failed, at the expiration of about twenty hours from the descent I performed the operation. Having dissected down to a membrane, which I considered to be the hernial sac, I punctured it at the upper part, and then laid it open its whole length. It extended within the ring, which, to obtain room for examination, I dilated. Upon further inquiry I found the hernia was seated more deeply, and that the membrane which I had laid open was the tunica vaginalis testis, extended by the hydrocele, which had entirely disappeared. I then, of course, dissected through this tunica vaginalis at the posterior part, and laid open the hernial sac, which contained a small portion of intestine, nearly black from strangulation. Having already dilated the ring, I could pass my finger some way above it, by which I discovered the obstacle to reduction to be a contraction at the mouth of the sac. By the assistance of a director I removed the stricture, and returned the intestine. The man is doing well. In this case the hernia must have been seated behind the cord.*

* For small congenital herniæ see the chapter on that subject.

CHAPTER XV.

Of Direct Inguinal Hernia.

AN inguinal hernia generally takes the course of the spermatic cord, and is therefore situated on the outer side of the epigastric artery, at the orifice where it first quits the abdomen. But sometimes the hernial sac protrudes nearer to the pubes than usual, descending from the abdomen immediately behind the abdominal ring; and then the hernia is situated on the inner side of the epigastric artery.

This variety of hernia has now very often fallen under observation, and has been, for more than forty-five years, described in the lectures delivered at Saint Thomas's and Guy's Hospitals.

Mr. Cline, on May the 6th, 1777, in opening a Chelsea pensioner, with Mr. Adair Hawkins, found a hernia on the right side, the mouth of which was situated an inch and a half on the inner side of the epigastric artery; and I have in my possession four other preparations of this species, which, with one that I destroyed in ascertaining the exact course of the disease, make six instances of this variety of inguinal hernia occurring within my knowledge; besides the cases which remain to be described in this chapter. Since the first edition of this work I have had frequent opportunities of examining this variety of hernia.

There is, besides these, a preparation of this kind in the Museum at Saint Thomas's Hospital, made by Mr. Baynham, now surgeon in America, more than forty years ago. In plate 7 it will be seen that the hernia on the right side was of this species, the epigastric artery being on its outer side; whereas that on the left is situated in the usual way with regard to this artery.

Plate 7, 8, 9, and 10, shew an external and internal view of this disease, and its situation with respect to the tendons of the abdominal muscles and the epigastric artery.

The abdominal ring is closed towards the abdomen by the tendons of the internal oblique and transversalis muscles. The lower parts of these tendons are inserted into the pubes, and connected with the fascia which passes upwards from the external oblique muscle at Poupart's ligament. If this tendon is unusually weak, or if from mal-formation it does not exist at all, or from violence has been broken, a protrusion of the viscera may then take place immediately behind the ring. I have only seen it produced by the first and last of these causes; that is, by weakness, and by rupture of the tendon of the latter: the following is an instance.

A gentleman applied to me who had been thrown from his horse, and had received a blow upon the groin which gave him great pain at the time, and produced a fulness at the part, which proved afterwards to be a hernia of this description, which could only have been thus suddenly produced by a rupture of the tendon of the transversalis. In an earlier part of this work I mentioned a similar accident in a boy, in consequence of a kick from his schoolmaster.

Below the abdominal ring the appearance of this tumour differs from that of common bubonocoele, in being situated nearer the penis; and the spermatic cord passes on its outer side instead of its posterior part, particularly at and above the abdominal ring. See Plates 7, 8 and 9.

Above the abdominal ring the sac passes directly upwards, so that no part of it takes the usual oblique direction towards the anterior superior process of the ilium, but rather the contrary direction inwards towards the linea alba. Examined by accurate dissection its course is as follows:—The sac first appears between the fibres of the tendon of the transversalis, nearly an inch directly above the ring, generally protruding before it the fascia transversalis. It then passes under the lower edge of the tendon of the internal oblique muscle. The epigastric artery runs upon the outer side of the hernial sac. The spermatic cord has no connexion with it above the ring. The hernia then emerges from the abdominal ring, the spermatic cord being on its outer side, and it is covered with the fascia given off by the tendon of the external oblique, but not by the cremaster muscle. See Plates 7 and 8, which contain a view of this hernia.

I have never seen it acquire the same size as the common inguinal hernia often does, but I have met with it somewhat larger than that which is shown in plate 7. An increase of bulk, however, does not render it more dangerous. In the greater number of cases I have found it accompanied by diseases of the urethra. One of the specimens in my possession contains six herniæ of this kind; it was taken from a patient of Mr. Weston's, surgeon

Cases.

Abdominal ring closed by a tendon of the internal oblique and transversalis muscles.

Appearance of the tumour.

Dissection of it.

Size.

in Shoreditch, who had long laboured under a difficulty in discharging his urine, and his health was too much broken, as well as his urethra too irritable, to admit of the common means of cure. On inspecting his body I found several strictures in the urethra, a stone impacted behind one of them; and six herniæ, three on each side, all of which were of the species above described. *See Plate 10.*

I shall mention the treatment of this hernia, as of the others, in its three different states.

Reducible.

When reducible, the truss should be longer than that required for common hernia, because the hole through which the sac emerges from the abdomen is one inch and a half further inwards towards the pubes; so that the pad of the truss must reach round as far as the abdominal ring itself, but still is not to rest upon the pubes. In other respects the form of the truss does not require to be changed.

If irreducible, the same means must be employed as in the common species of inguinal hernia.

Strangulated.

When strangulated, the attempt at reduction should be made in a direction different from the usual mode. The tumour is, as in the other kind, to be grasped with one hand, but the fingers of the other are to be placed at the abdominal ring to *knead* the hernia at that part, directing the pressure upwards and inwards, instead of upwards and outwards, in order to return the tumour into the abdomen.

Case.

A man was admitted last summer into Guy's Hospital, who had a hernia of this kind strangulated. He came in on account of other complaints, but on complaining to Mr. Stocker, apothecary to the hospital, that he was frequently sick, so as to vomit, Mr. S. examined him, and found a hernia on the right side of the scrotum. I was desired to see him, and found that the tumour extended no higher than the abdominal ring, where it was lost; the spermatic cord passed upon the outer side of the hernia, which last took a direction towards the region of the pubes, instead of being inclined towards the spinous process of the ilium. I desired him to draw up his thighs at right angles with his body, and to place his knees together, and then, by grasping the tumour with my right hand, and pressing it at its mouth upwards and inwards in a direction towards the umbilicus, a reduction was soon effected, and all the symptoms of strangulation vanished.

Mode of reduction.

Operation.

If the operation for this variety of hernia be performed in the manner usually advised in bubonocoele, that is, by dilating the hernial sac and stricture upwards and outwards, the epigastric artery will certainly be divided. It has therefore been recommended to alter the direction of the incision, and to make it upwards and *inwards*, to avoid the epigastric artery; and, if the surgeon is certain as to the species of hernia, that is the safest plan. But if, in some instances, the operator is directed to make the incision in one way, and in others precisely the reverse, there will always be reason to fear some mistakes in practice, which would be attended with the most serious consequences; such mistakes, it is true, would hardly occur to a surgeon constantly in the habit of dissection, but to the greater number the distinguishing marks of the two species will not be sufficiently discriminative. It is therefore desirable to point out such a mode of operating as would ensure the safety of the patient, of whatever kind the hernia may be. Such are the advantages possessed by the method of making the division directly upwards, opposite to the middle of the hernial sac, for in this direction the epigastric artery is certainly avoided.*

The operation, therefore, is to be performed in the following manner:—The surgeon first makes an incision through the integuments, along the middle of the tumour, from its upper to its lower part, following the longitudinal direction of the tumour; so that if it has any inclination inwards towards the umbilicus, the incision is to incline the same way. The fascia being thus exposed, is divided over the surface of the tumour from the abdominal ring down to its lower extremity. The hernial sac, which now comes in view, is then opened, from an inch below the ring down to the lower part of the sac, in the same cautious manner as has been formerly described. The surgeon then passes his finger into the sac, and feels for the stricture; if at the abdominal ring, he introduces the blunt-pointed bistoury between the sac and the ring, slitting the latter directly upwards, till the aperture is large enough to allow of the return of the parts; if the stricture is above the ring, he follows it with the knife still in the same direction, and anterior to it, opposite the middle of the mouth of the sac, till the dilatation is sufficient to allow his finger to slip into the cavity of the abdomen; after which the hernia is to be pushed up, or, if not in a fit state for that purpose, to be treated as mentioned in a former chapter. The parts anterior to the sac above the ring, and divided by the knife, are the tendons of the transversalis and internal oblique muscles. If the stricture is within the sac, still the same direction is to be preserved, but the knife must then be passed into the sac itself.

In this way the epigastric artery will, with certainty, be avoided; which it cannot be if the division of the stricture is made outwards, and in the common hernia it will be divided by dilating inwards.

* A diagnostic mark, whereby the operator can form a correct judgment as to the kind of hernia under his knife, has been attempted to be supplied by circumstances of too variable a nature to warrant entire dependance upon them. The form of the swelling, the situation of the epigastric artery and spermatic cord, the want of an entire covering from the cremaster muscle, give the direct hernia a distinct character; but these anatomical relations are either too uncertain to be depended upon in a delicate operation, or are such as dissection alone can render evident. The shape of the tumour varies from that of the oblique inguinal hernia, in not descending into the scrotum so low, and in the neck

Some, however, have doubted the possibility of the epigastric artery ever being divided, whatever may have been the direction of the incision; and, in support of this opinion, they adduce the great number of operations which have been performed by various practitioners, without the occurrence of this accident. However, this artery may actually have been divided, and produced the patient's death by pouring its contents into the cavity of the abdomen, without the surgeon being aware of the mischief which his knife has occasioned; and even when the accident has been known by him to have happened, the circumstance has been concealed from the public. In proof of the possibility of dividing this artery, I shall mention the following cases.

A patient of Mr. Sterry's, surgeon in Bermondsey Square, had been for three days labouring under the symptoms of strangulated hernia. The hernia was scrotal, and as it had resisted every attempt at reduction, Mr. S. requested me to see him; the operation being agreed upon, I performed it precisely according to the rule usually laid down, for dividing the mouth of the hernial sac; that is, upwards and outwards. As soon as the division was made, a quantity of arterial blood was seen flowing down over the intestine within the sac, and the bowel being immediately returned, a considerable stream of arterial blood flowed into the sac. Pressure was made upon the groin in the situation of the epigastric artery, in order to prevent the hæmorrhage, and apparently with success; but four hours afterwards Mr. Sterry was sent for on account of a copious discharge of blood from the wound. He made a further pressure, but without success, and the man died in ten hours after the operation; becoming gradually faint after it, and the abdomen being distended with blood.

For the following case I am indebted to my friend Mr. Davie, now unfortunately no more, who allowed me to insert it here.

Daniel Pyson, a farmer's servant at Wingham, in the county of Kent, about twenty years of age, and of a healthy constitution, had been subject to an inguinal hernia from a child, which, at Christmas 1801, became strangulated, but had been reduced by Mr. Ferriar, surgeon of the place, by the application of ice. In August, 1802, it became again strangulated, and, as I happened to be in the neighbourhood, I was sent for to him. I found that he had worn a truss, which had closed the sac of the original hernia; but another had protruded to the outer side of this, nearer to the spine of the ilium.

The tumour was scrotal, about the size of a hen's egg, and had all the characters of hernia, excepting a slight inequality near the ring. I tried the usual means of reduction without success, on which the operation was proposed, to which the patient readily consented.

After making an incision from the upper to the lower part of the sac, I cautiously made an opening into it, and was surprised to find that it contained neither intestine nor omentum, but only about two ounces of water. It had no communication either with the abdomen or the tunica vaginalis testis, and had the appearance of an old hernial sac; and, as I did not then know that he had formerly had a strangulated hernia, I was at a loss to account for it. I continued the incision upwards, so as distinctly to expose the abdominal ring, and then saw a second hernial sac, about the size of the end of the thumb projecting through it, situated on the side of the other. Having opened this hernial sac, I found within it a fold of strangulated intestine, which was closely embraced by the ring. I passed a Pott's bistory between the tendon and intestine, and divided the tendon, which I could distinctly see. The sac was continued upwards under the tendon, and on introducing my finger within it, I found the stricture infinitely greater at this part, so that I long tried in vain to introduce the point of a curved bistory within the stricture. At last I succeeded in dividing this stricture; but unfortunately, though I was at that moment aware of the danger to the epigastric artery, I cut that vessel whilst dilating the stricture, of which I was immediately sensible, by perceiving a copious flow of blood.* The nature of the injury being clear, it only remained for me to stop the blood, for which I made many fruitless endeavours, till after bleeding for an hour the patient fainted from the hæmorrhage. At this time a coagulum was formed over the wound, and he was ordered to bed, and to be kept cool. On recovering, it seemed as if the bleeding was entirely stopped; but at four o'clock on the succeeding morning a vomiting came on, and about four ounces of coagulated blood, which had been collected in the abdomen near the wound, being thereby forced out, a second bleeding took place, which, before I could reach him, had run through the bed to the floor. When I visited him at eight o'clock he had no pulse at the wrist, and seeing that his death was inevitable, unless something was done to stop the flow of blood, I determined to cut down upon the artery; but as I wished for the presence of some respectable surgeon at the time, I went to Mr. Wood, of Wingham, to request a consultation, having, before I left my patient, introduced a dossil of lint within the wound up towards the abdomen, and desiring a constant and considerable pressure to be kept up midway between the abdominal ring and the spine of the ilium. On my return I was rejoiced to find that there had been no external bleeding, and that his appearance was improved; it was therefore thought right to suffer the lint to remain in, and the pressure to be continued; which was accordingly kept up without intermission for four days, after which the lint was withdrawn without any further accident. The extreme degree of debility which followed the loss of blood, rendered his bowels so torpid as to prevent his having a stool before the third day, and it was then produced by calomel and colocynth, and by clysters. On the same account I was under the necessity of using a catheter to draw off his urine. However, at the end of five weeks he had so completely recovered as to resume his usual occupation.

The hernia in the first of these cases must have been the variety I have mentioned, in the second it was a common hernia; but no one can now doubt of the possibility of dividing the epigastric artery in the common

of the sac being larger in proportion to its body than in the common hernia. This peculiarity of form is owing to the dilatation of the external ring, which in this hernia is remarkable, and renders the neck of the sac large; and to the tendinous fascia of the transversalis that protrudes before the sac, and rarely yields so as to allow it to descend very low into the scrotum. The situation of the epigastric artery cannot be ascertained before the operator has divided the stricture, and is enabled to pass his finger into the abdomen to feel its pulsation, when the knowledge of its course ceases to be a matter of importance. The partial covering given by the cremaster, the course of the cord on the

* Mr. Turner, one of my house pupils, was present at this operation, and informs me that Mr. Davie divided the abdominal ring upwards, and the stricture at the mouth of the sac inwards.

method of performing the operation; other testimonies might here be added, but without the permission of the surgeons who performed the operations, I should not think myself justified in mentioning the cases.* However, in all the varieties that hitherto have been observed in the structure of these parts (excepting where the spermatic cord passes over the sac, when the dilatation must be made outwards) the division of the stricture directly upwards, opposite to the middle of the mouth of the hernial sac, will obviate every danger.

outer side of the sac, or the want of obliquity in the direction of the tumour, cannot be relied upon; the latter circumstance attends often the common form of hernia, when the rings are brought nearly in apposition; and the former are by no means invariable occurrences in direct hernia. It is not uncommon to find the dilatation of the external ring so great, that the hernia, instead of pushing the cremaster and cord to its outer side, insinuates itself between them, and thus becomes covered by muscular fibres. We have, in the collection of preparations in the museum of Guy's Hospital, a specimen of direct hernia, in which the sac has passed between the cord and cremaster muscle, so as to receive a complete covering from the latter, while the former lies behind the sac.

This drawing of a direct hernia was taken from a dissection I made of a subject who had one on each side, examined by Sir Astley Cooper. The object of it is to shew the covering which the tumour receives from the combined tendon of the transversalis muscle, and the fascia transversalis. These two structures are so blended that no line of demarcation can be traced between them, and are dilated by pressure into a bag which completely envelopes the hernial sac. Its thickness varies; on the fore and upper part it preserves its tendinous character; but towards the lower part it becomes attenuated, resembling condensed cellular membrane. The fascia from the external ring was in this subject very thin, having acquired no increase from the pressure of the sac.

The proportion of direct to oblique inguinal hernia, as stated by Mr. J. Cloquet, is one in five. This is a far greater proportion than I have met with in the bodies of those whom I have examined with hernia.—Ed.

References to Plate.

- a. Spinous process of ilium.
- b. Tendon of the external oblique muscle, reflected from Poupart's ligament.
- c. Pubic attachment of the tendon of the external oblique.
- d. Internal oblique, partly raised to shew the transversalis muscle.
- e. Transversalis muscle.
- f. Tendon of the transversalis muscle and the fascia transversalis, elongated by the pressure of the hernial tumour, and protruded through the external ring. The tendon and the fascia transversalis were so blended as not to be distinguished. This bag is cut open to shew the peritoneal sac.
- g. Peritoneal sac, connected to the tendinous bag by cellular membrane. There is frequently a considerable quantity of fat found between the fascia transversalis and peritoneum, which in some cases of direct hernia is protruded before the peritoneum, and in the operation may lead to the supposition of omentum being exposed.
- h. Testicle.
- i. Fascia detached from the edge of the external ring, left adhering to the cremaster, which was attached to the outer side of the tumour, while the cord was at the outer and back part.



* In an earlier part of the work I have given two cases in which the epigastric artery was divided; one from Mr. Giraud, and one sent me by Mr. Lawrence. See chapter ten. *Jat. Basire. sc.*

CHAPTER XVI.

Of Inguinal Hernia in the Female.

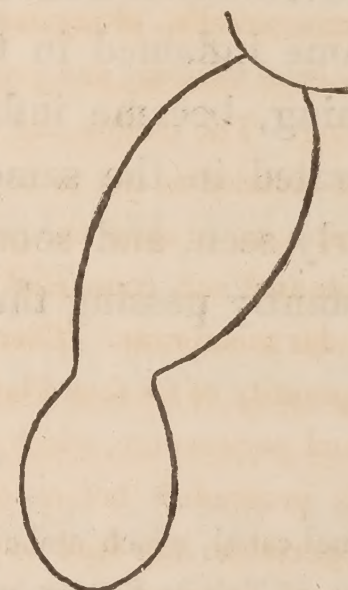
THE round ligament of the female, which arises from the fundus uteri, and is fixed in the fat and integuments of the pubes, preserves a course similar to that of the spermatic cord in the male; that is, it passes out from the abdomen midway between the symphysis pubis and spinous process of the ilium, under the edges of the internal oblique and transversalis muscles, above Poupart's ligament, and on the outer side of the epigastric artery. To confine the lower edge of the transverse muscle, and to assist in closing the abdomen, a fascia similar to that in the male is sent upwards by the crural arch, which passes behind the muscles of the abdomen.

Structure of parts.

The round ligament of the uterus, like the spermatic cord, takes an oblique course in its passage from the abdomen, before it emerges through the ring to be gradually lost upon the pubes; so that the inner ring is two inches to the upper and outer part of the abdominal ring. As this ligament is much narrower than the spermatic cord, the opening corresponding to the abdominal ring in the male is much smaller; being, in the female, not more than about half an inch in length, and a quarter of an inch in breadth. On this account inguinal hernia is a much less frequent disease in the female than in the male.

The female inguinal hernia, as in the other sex, passes out of the abdomen midway between the ilium and pubes, under the edges of the internal oblique and transversalis muscles; both of which, but especially the latter, form a semicircle over it, being attached to Poupart's ligament on the outer side of the tumour, and after passing across it, are inserted into the pubes on its inner side. The transversalis fascia given off by Poupart's ligament runs directly upwards on each side of the tumour. The hernia, therefore, descends through the inguinal canal to the external ring, and appears as a tumour about the size of a pigeon's egg in the upper part of the labium pudendi. The appearance, however, of the tumour is peculiar; unlike the inguinal hernia in the male, it seems to consist of two swellings connected at the external abdominal ring; one contained in the inguinal canal, the other in the labium pudendi. This arises from the small size of the two apertures in the female, which yield with difficulty to the pressure of the hernia. Below the abdominal ring, this hernia receives a covering from a fascia given off by the tendon of the external oblique muscle, but much thinner than in the male; and above the ring it is covered by the tendon itself.

Course of the hernia.



The same symptoms characterize, and the same causes produce the disease in the female as in the male. The contents, also, are for the most part intestine and omentum; but sometimes, also, it happens that the hernia contains the appendages of the uterus. I lately met with an inguinal hernia, the contents of which were the ovary and fallopian tube; the preparation is preserved in the museum at Guy's Hospital.

This disease is little liable to be confounded with any other; for the round ligament is not subject to the same enlargement and diseases as the spermatic cord, and it is the diseases of the testis and its coats that occasion the principal difficulties in distinguishing hernia in the male. I have known, however, the femoral hernia in the female mistaken for the inguinal species, which is not unlikely to happen from the contiguity of the situation of the two.

Diagnosis.

I was sent for, in 1802, to a lady in the country, who had for several days been suffering under the symptoms of strangulated hernia, which had been supposed by her medical attendant to be inguinal, and had resisted all the means of reduction. I found it, however, to be a femoral hernia, and this mistake was the cause of the failure in the attempts to return it, as the means of reduction differ much from those necessary in the other species; so that, when known to be femoral, it was very soon reduced.

Case.

The way of distinguishing the one species from the other, is to feel with the finger the course of Poupart's ligament; if the neck of the tumour is situated above its edge, the hernia is inguinal; but if the tumour is below the ligament, it is femoral. The spinous process of the os pubis also assists in the diagnosis; if the hernia is inguinal, the spine of the pubes is felt to the outer side of the tumour; while in the femoral species, the neck of the tumour is invariably to the outer side of that process of bone.*

* The adipose structure about the abdominal ring, in the female, often renders the nature of a small tumour obscure, and when unaccompanied with symptoms of strangulation a small hernia may deceive an experienced surgeon. The following case is an example of this: the protrusion was attended with enlargement of the glands in the

This hernia, as in the former instances, may be considered in the three states of reducible, irreducible, and strangulated.

Reducible.

In the reducible state a truss must be worn similar to that used in the male, to prevent a future descent; but I saw about twelve months ago a case of this kind, in which the hernia was so large that it could not be supported by a common truss; and the method which the woman adopted to enable her to attend sufficiently to her domestic affairs, was to have a sling bandage passing over her shoulders and between her thighs, thus embracing the tumour, and preventing it from increasing so much as to impede the motions of the thighs, which was continually happening before she used this contrivance. The springs by which this bandage was supported, were the spiral elastic wire springs now so generally worn by gentlemen across the shoulders.

Irreducible.

If irreducible, this hernia can only be supported by a common T bandage; but the women that I have seen labouring under irreducible inguinal hernia have generally preferred leaving the complaint to itself; and, excepting in the instance above related, where I had reason to suspect some mal-conformation and unusual enlargement of the opening into the abdomen, and the following one, I have never seen the tumour grow to a very considerable size. If it is omental only, a spring truss may be worn.

When the hernia is allowed to increase to this very unusual size, the integuments will slough or ulcerate, and from the thinness of the coverings, great danger exists of the sac and its contents participating in the inflammation. The following is an instance of this accident, followed by sloughing of the intestine, and the formation of an artificial anus.

Case.

Elizabeth Fuller, aged sixty, was admitted into Guy's Hospital, on the 6th of September, 1809, on account of a very large inguinal hernia on the right side, which first made its appearance about thirty-eight years ago, and was then very small—not larger than a nut. Its first appearance was immediately after a lying-in; it sometimes occasioned pain in the bowels; it disappeared in the recumbent posture. After this she had six children; and the hernia increased gradually, until at the end of six years it had attained its present size. She could always previous to that return the contents of the hernia; but after that period adhesions formed, and it has always since remained irreducible. From that time, until about six years ago, the hernia continued without alteration; she was not inconvenienced from its size, and she followed her usual labour. About six years ago the integuments at the lower part of the hernia became inflamed in two parts about the size of a shilling, and went on to ulcerate, after which the intestine protruded through the opening, became inflamed, mortified, and sloughed; it was poulticed, and healed soon. About four years ago the integuments again ulcerated in the same place as before, and a small portion of intestine again protruded; the internal or villous coat of the intestine was clearly seen, and soon after the intestine formed adhesions to the edge of the wound, and ulcerated so as to allow the fæces to be constantly passing through involuntarily. This has continued now for at least twenty months, during which time she has had no stool

inguinal canal, which embarrassed the diagnosis, and led to the unfortunate termination of the case. For the following narration of the circumstances I am indebted to Mr. Cooke, of Trinity Square, who was called in to the case a short time before the patient died.

On Monday, June 18th, 1826, I was requested to see Miss R—, aged thirty-two, who, I was informed, had been suffering under a bilious attack since the preceding Thursday evening or Friday morning. She had been much subject to attacks of this nature, and the existing symptoms were attributed to an unusually long walk, taken under a hot sun on the Thursday, and to her having eaten some rather indigestible aliment afterwards. I found her lying on the sofa, continually vomiting a greenish fluid; her countenance was exceedingly distressed, the bowels were constipated, and she had occasional pain in the abdomen, but it was not acute. I felt strongly impressed, at once, with the opinion that these symptoms arose from mechanical obstruction, and inquired if there were any swelling in the groin. She stated that there was; and in the right groin I found a tumour about the size of a walnut, but neither tense nor tender. Believing it to be hernia, I attempted its reduction; but she assured me that it could be only a glandular swelling, and gave me the following reasons for that opinion. She first detected it when walking up stairs two years ago, and since that time it had never wholly disappeared, though it was generally larger at the menstrual periods than at other times. It had given her little inconvenience, and therefore she did not consult any professional man on the subject till about two months ago, when, at the desire of her friends, she consulted an eminent and experienced surgeon (since dead), who, after very careful examination, felt convinced that the swelling was glandular, and prescribed a galbanum plaster. It had also been seen and examined at the same time by an intelligent surgeon, a relative of the patient, who concurred in this opinion. She stated also that the same gentleman had attended her, and watched the progress of the existing attack, but remained convinced that the swelling in the groin had no connection with the other symptoms.

From the description of the patient (and there was no other person in the house who could supply any information), I could not ascertain the extent of acute disease which had occurred at the commencement of the seizure, but I learnt that there had been some degree of active inflammation.

Clear as the case appeared to me at first, I felt unwilling to act upon that opinion without seeing the gentleman who had previously attended, and who had viewed the case in a different light; but I was informed that he could not meet me till the evening.

With respect to the means employed during the three preceding days, I had the pain of ascertaining that whatever might have been the view taken of the case, efficient remedies had been totally neglected. The pulse, though quick, was moderately firm, and therefore I determined to withdraw a few ounces of blood, which she bore moderately well. I prescribed effervescing draughts, with some purging pills, and recommended the warm bath if it could be borne. When we met in the evening the patient was moribund and expired before we left the house.

In addition to the detail given by the patient, the gentleman informed me that when the tumour was first submitted to his inspection, and to that of the eminent gentleman alluded to, it evidently consisted of three portions as if there were a cluster of enlarged glands. He told me, moreover, that on the Friday he found the part very tense and painful, but that it had gradually become much better. It was clear, from the subsequent examination, that this delusion arose from sphacelation having taken place.

Dissection.—On the following evening I examined the body, with the assistance of the gentleman who had attended the patient. We found the whole of the small intestines inflamed, and a small portion of the ileum was entangled in a very firm stricture in the groin. I carefully cut down upon the hernia, as in performing the operation. When the sac was opened a thick layer of coagulable lymph concealed the intestine, and was also found adherent to the inner surface of the sac. The intestine itself was of a livid hue; it had passed from the abdomen, having the epigastric artery running on the inner side of the ring. The stricture was exceedingly confined. Immediately above the hernia, and at its inner side, the glands were considerably enlarged.

In a case of this ambiguous nature, when the more likely means of affording relief had been employed without good effect, it would have been proper to cut down on the tumour to ascertain its nature. Had it proved glandular no harm could have resulted. We may derive, too, from the preceding detail, an instructive lesson on the evil of delay; a few hours may place the patient beyond the power of relief.—Ed.

by the rectum, except about six weeks after the intestine began to protrude, when she had a very painful and difficult motion consisting of a few hard lumps of fæces. Wind has never passed by the rectum since the intestine has protruded through the hernia; but she has frequently wind passing through the intestine. The peristaltic motion of the intestine could always be seen from the first. Both solids and fluids very soon pass through her; greens pass through without undergoing much change.

When an inguinal hernia in the female becomes strangulated, reduction must be attempted by the Taxis in the manner formerly described, the thighs being bent at right angles with the body, and brought very near to each other, the tumour is then to be embraced with one hand, and pressure made at the mouth of the sac with the other. If this does not succeed, the tobacco clyster, ice, and the other powerful means of assisting reduction must be resorted to. Strangulated.

If the operation becomes necessary, it should be performed in the following manner:—The patient being prepared, and placed as in the male subject, an incision is to be made, beginning at the abdominal ring, and continued down to the lower part of the tumour, which seldom projects much below the ring. This divides the external pudendal artery, which is not so large in the female as in the male, and exposes the fascia which covers the hernial sac. The fascia being then cut through, the sac itself appears, which is to be carefully penetrated by a small incision, to allow of the contents being examined; after which a bistory is to be introduced between the sac and the abdominal ring, which last is to be dilated. If any stricture be felt higher up, this must be dilated in the same manner as I have directed the stricture in the male subject to be divided, and also in the same direction. The contents of the sac, if not mortified, are then to be returned. Operation.

The operation is attended with much more difficulty than in the male, on account of the obliquity of the inguinal canal being generally preserved in inguinal hernia in the female. The last case of this kind which I witnessed was attended with considerable embarrassment; it occurred under the care of Mr. Forster; the sac was opened, but instead of intestine presenting itself a quantity of water issued from the lower part of the sac, and neither intestine nor omentum was to be seen. He doubted, at first, whether the disease were any thing more than a common cyst containing serum; but on pressing his finger higher up the inguinal canal, he found a considerable bag, which he proceeded to lay open. Having divided the abdominal ring, as a preliminary step, he made an incision into this portion of the sac, and found a small convolution of intestine firmly grasped by the neck of the sac at the internal ring. He divided the stricture, and the patient soon became convalescent.

If the operation be undertaken so early as to render it highly improbable from the symptoms that mortification has taken place, it may be performed without opening the sac, by dividing the integuments and fascia, and setting free the stricture at the ring, or higher up, as above described. The wound is to be closed with sutures, and all that has been observed in the after treatment of hernia in the other sex will equally apply here.

As in the male, the inguinal hernia of the female sometimes lies concealed under the tendon of the external oblique, not having yet forced its way through the ring, and in this state, if strangulated, the cause of the symptoms often remains unknown to the medical attendant. Hernia in the canal.

A woman was admitted into Saint Thomas's Hospital for symptoms of inflammation of the bowels; and as she vomited frequently, and had no passage by stool, Dr. Blane, whose patient she was, inquired if she had no tumour at the groin or navel, to which she replied in the negative. She was bled, put into the warm bath, and various means were used to procure a passage by the bowels, but without success; and in two days she died. The doctor still suspecting, however, that some concealed hernia might have been the cause of the symptoms, had the body examined; when a small fulness was seen on the right side, which being opened, proved to be a hernia, extending from the abdomen to about an inch below the abdominal ring. It contained a very small portion of intestine, which was strangulated by the pressure of the parts that surround the aperture through which the round ligament quits the abdomen. The preparation of this hernia is preserved in the Museum of Saint Thomas's Hospital. Case.

The operation on this small concealed inguinal hernia, is the same as that required for the same disease in the male. An incision is to be made the length of the tumour, and the tendon of the external oblique exposed, which being next cut through, the hernial sac appears. This is to be opened, the stricture which surrounds its mouth set free, and the hernial contents returned. Operation.

That variety of inguinal hernia in the male which descends upon the inner side of the epigastric artery, I have never met with in the female.

CHAPTER XVII.

On the Congenital Hernia, or Hernia Tunicae Vaginalis.

Difference from
the inguinal.

THE difference between this and the common inguinal hernia is, that the protruded parts are contained, not in a distinct sac given off by the peritoneum, but in the bag of the tunica vaginalis of the testicle, and apparently in immediate contact with the testis itself.

Change of situation
in the testis.

The origin of this disease is derived from the change of situation which the testis naturally undergoes during the foetal state; for during the first seven months of foetal life the testicles are situated within the abdomen upon the loins, whence, in the eighth or ninth month, they descend into the scrotum.

Previous to their descent each lies upon the psoas muscle, just below the kidneys, this being the most convenient situation for receiving the spermatic arteries from the aorta, and for the spermatic veins to return the blood into the vena cava inferior, on the right side, and into the emulgent vein on the left. *See Plate 4.* The vas deferens at this time passes down from the testicle behind the bladder to terminate in the urethra. From the lower part of the testicle and epididymis arises a long ligament, called the gubernaculum, which passes into the scrotum in the same course that the spermatic cord takes after the descent of the testicle, and it seems designed to draw the testis down into the scrotum, or at least to direct it in the course which it is about to take.

The testicle, and the different vessels connected with it, are covered by peritonæum, every where except at the posterior side of the testicle where the vessels enter it, and the same may be observed of the gubernaculum through a part of its course.

Time of the descent
of the testis.

At the eighth month the testis descends through the abdominal ring into the scrotum, bringing with it a portion of peritoneum, which is previously somewhat looser at the lower part of the abdomen than elsewhere, and which becomes afterwards the tunica vaginalis testis. This descent is so gradual, that the peritoneum is not drawn out from the abdomen, nor is any part of this membrane within the belly displaced, but it falls down into the scrotum by elongation or slow increase of growth. The time at which the testes are usually found in the scrotum is at the ninth month, but this is liable to great variety, so that frequently one testicle appears in the scrotum at birth, and often neither. In some persons months and years elapse before they are descended. The abdominal ring appears to be the chief impediment, so that in persons in whom the testicles have not descended, these organs are usually found in the groin just above the ring. They are exposed to injury, and give a general form to the pelvis like that of the female. I saw, some months ago, a gentleman who had a tumour in each groin, which was the testicle. Sometimes, however, they remain entirely within the cavity of the abdomen.

Tunica vaginalis
closes.

After the descent of the testicle, the opening through which it passed from the abdomen closes: but the time at which this takes place is liable to considerable variation. Professor Camper gives the following remarks on this subject from his own observation. In seventeen new-born children which he dissected, eleven had the cavity of the tunica vaginalis open to the abdomen; in three, it was obliterated on the left side, and in two, on the right. In one only it was entirely obliterated on both sides. When the cavity of the tunica vaginalis remains open at birth, the violent efforts which the child makes as soon as it begins to breathe, occasion a portion of the small intestines, which lie over this opening, and are in an empty state, to fall down into this cavity. This protrusion is the hernia congenita, and it is immediately perceived by the swelling of the scrotum during the efforts of crying. It is called by nurses the windy rupture.

Remains open.

The tunica vaginalis sometimes remains unclosed for many years after birth, though the testis has descended. I dissected a boy, six years of age, in whom both the testes were in the scrotum, where the opening of the tunica vaginalis was still so large, that I could pass a female catheter through it down to the testis. There was no appearance, however, of a hernia having yet formed, but when he had begun to labour hard, one of the congenital kind would probably have been produced. This explains the case of a man who underwent the operation for strangulated congenital hernia in Saint Thomas's Hospital, and he assured me, after the operation, that he had never had any appearance of rupture till seven weeks before.

Closed only at the
ring.

Sometimes the tunica vaginalis becomes closed at the ring, but remains open above it, in which case, if a

descent of the intestine occurs, a singular variety of hernia is produced; being congenital, but at the same time inclosed in a proper sac within the tunica vaginalis. I shall presently relate a case of this kind, which was furnished me by my friend and colleague Mr. Forster. A similar case is given in Mr. Hey's very excellent Surgical Observations.

The course of the hernia congenita must necessarily be the same as that of the spermatic cord, which descends from the abdomen under the edge of the transversalis and internal oblique muscles to the abdominal ring, through which it passes to the bottom of the scrotum. The tunica vaginalis, which contains both the cord and the hernia, is covered by the tendon of the external oblique muscle above the ring, and by the cremaster and fascia below it. The epigastric artery passes obliquely upwards close to the orifice where the tunica vaginalis first quits the abdomen, between it and the symphysis pubis. The spermatic artery in its whole course lies behind the hernia.

Course of this hernia.

The distinguishing mark of the congenital hernia, as it commonly occurs, is, that the testicle, which is distinct from the hernial sac in the common inguinal hernia, being situated below it, is here involved in the contents of the hernia, so as to be with some difficulty distinguished from it. Another characteristic mark is the sudden and complete descent of the rupture, as in the case above alluded to, that occurred in Saint Thomas's Hospital. In the common inguinal hernia the formation of a sac is the work of time; the peritoneum becomes elongated, and the descent into the scrotum is a gradual process. But in the congenital species, the tunica vaginalis remaining open below the abdominal ring, a bag is ready formed to receive the bowel, when sudden exertion or violence breaks through the adhesions at the mouth of the canal. In 1817 I operated upon a young man, who, in lifting a sugar cask, suddenly caused a scrotal hernia, which, for the first time, appeared six and thirty hours before his admission into the hospital: on opening the sac it proved to be of the congenital kind. Besides, as the general appearance of this tumour resembles that of hydrocele, much care is requisite in attending to all the other characteristic marks of the two diseases. Sometimes water, collecting in the abdomen, descends along with the hernia, and as the lower part of the tumour is transparent, it gives the idea of the whole being a hydrocele. This complication of disease may be known by returning the whole contents into the cavity of the abdomen, when the patient is in a horizontal posture; then, by putting the finger against the abdominal ring, the water will slip by it and fall down into the scrotum, producing a transparent tumour or true hydrocele; after which, if the pressure of the finger is a little lessened at the ring, and the patient is desired to cough, the intestine and omentum will be felt falling down into their former situation.

Distinctions.

In the reducible state, the congenital hernia requires the application of a truss precisely in the same manner as in common inguinal hernia: when the tumour is small, the pad must rest midway between the symphysis pubis and spine of the ilium; but when large it should reach to the upper part of the abdominal ring. In children who are but just born, pressure can only be made by means of a compress of linen, or of a cushion filled with wool, and compressed upon the part by means of a bandage; and if the descent of the intestine is thus only for a few days prevented, the tunica vaginalis will generally close; but if it does not, a truss with a very weak spring, covered by oiled silk to prevent its being spoiled by moisture, may be applied. The earliest time at which I have known one worn has been at the period of eight weeks after birth. The contents are generally intestinal, the omentum in young children not descending low enough to reach the ring.

Reducible.

I have seen a congenital hernia complicated with an interruption of the descent of the testicle, which had only reached the abdominal ring. In such cases no truss should be applied, as the hernia is of use in forcing the descent of the testicle. When a truss has been worn for some time, it shuts the mouth of the tunica vaginalis at the abdomen, sometimes leaving an effusion of water in the tunica vaginalis below. If in these instances, by pressure at the abdomen, the tunica vaginalis also becomes closed immediately above the testicle, the portion intercepted between these two closures retains the effused water, forming a hydrocele of the spermatic cord. When a hernia thus enclosed with the testicle in the inguinal canal becomes the subject of strangulation, very nice examination is required to detect the exact nature of the swelling. My late colleague, Mr. Lucas, operated upon a case of this kind; the account of the case, which is given by my late dresser Mr. Wagner, of Charleston, U. N., renders it probable that it was an encysted hernia of the tunica vaginalis, a species that I shall presently describe.

Hernia and testis at the ring.

David Daughton, labourer from the country, aged thirty-seven years, was admitted into Guy's Hospital, with symptoms of strangulated hernia, by Mr. Harris, the dresser of Mr. Lucas, at four o'clock, a. m. on Saturday, July 27th, 1816. Patient has enjoyed good health generally; is of stout habit of body, and has led a regular life. He was attacked, on Wednesday morning last, with violent pain in the abdomen, and sickness and vomiting; had a copious stool at the time of attack, and a slight one on Thursday, but none since; has vomited very frequently, and been unable to retain any thing on the stomach; had frequent eructations, and great disposition to go to stool; was bled 20 oz. on Friday without relief; took repeated cathartics, which were thrown up again, and had enemata thrown up without effect. The tumour, which is in the right groin, is of equivocal nature; patient describes it as having had a swelling for twenty years in that situation, and accounts for it by a kick which he received from a horse, which caused, as he thinks, a retraction of the

Case.

testicle on that side. Both testicles before this time he could readily pass up into the groin, and they would again return into the scrotum; but the right testicle could never come down after the blow: he does not know if it was up at the time of receiving the hurt, or if it went up by the blow. The left testicle could be passed up above the external ring at the present time. Upon minute examination it was found the tumour in the groin could be separated into two distinct portions, that with a little care the testicle could be drawn down by the fingers of one hand, while, by the others, a second tumour was felt above it, protruding the internal ring, being of the size of a pigeon's egg, distinctly circumscribed, and very slightly dilating on coughing; there was no tenderness in the groin, except when the lower tumour was squeezed. Upon admission, the patient complained of pain across the abdomen, like unto a band surrounding it; vomits excessively, and discharges from the stomach a yellowish coloured fluid of very offensive taste and smell, which is decidedly feculent, and has also a very bitter taste. Patient has been put into the warm bath, continued there twenty minutes, and the Taxis tried without success; there was great faintness induced.

Half-past eight o'clock, a. m. A tobacco enema, of the usual strength was thrown up; the effect was immediate; he became faint, sick, and vomited; a slight perspiration broke out, the pulse was quickened, became fuller and somewhat hard; the pupils dilated; the Taxis attempted without effect; patient very speedily recovered from the effects of the enema, and his strength was not diminished; in half an hour the remainder of the injection was given, but its effects were trifling; the pulse a little quickened, and he complained of some uneasiness in the head.

Ten o'clock. Patient vomits repeatedly; complains much of his head; is giddy; pupils dilated; considerable tension of the abdomen.

Half-past eleven o'clock. Patient complains of pain in the abdomen, in the direction of the attachments of the diaphragm; has inclination for stool, but can void nothing; is occasionally sick, and vomits small quantities of offensive bitter fluid, in smell very like feculent matter; pulse 100, small and rather feeble; dizziness gone off.

At one o'clock the patient was taken into the theatre for operation. The pubes being shaved, there appeared a tumour in the course of the inguinal canal, in the direction of which and over it was made the external incision through the integuments; this exposed the fascia superficialis, which, being divided, gave an indistinct view of the tendon of the external oblique muscle, which was very thin; the next cut opened into the cavity of the tunica vaginalis,—a small quantity of fluid escaped, and the testicle was seen at the lower part of the inguinal canal, about half an inch above the external ring; the tunica vaginalis being dilated, gave a distinct view of the hernial sac, which was protruding the inner ring, and passing into the cavity of the tunica vaginalis, extended down to about one inch of the external ring; the cord passed a little over the fore part and to the inner side of the sac; it was pushed altogether to the inner side during the operation; the sac was pinched on the fore and lower part with a view to raise a very small portion and open into it, but this was found impracticable, for the intestine seemed to be adhering at all parts close to the inner surface of the sac; several examinations were made in different situations of the sac, but the intestine seemed to be firmly glued to that which covered it; an attempt was made to return it without opening into the sac, but this did not succeed. The whole sac was now drawn down, and the strictured portion was distinctly seen; then a small part was pinched up by the nails at the upper and outer part of the sac near to the neck; here after repeated and very delicate scratches a small opening was made and dilated to the extent of half an inch, beyond which all the contents were adhering closely to the inner surface of the sac. With some care the adhesions were broken, though the intestine was at the fore part glued closely to the sac: there was a very small portion of omentum at the upper part of the sac; the adhesions did not appear all of them to be recent; the portion of intestine which was strangulated was but an inch or an inch and a half, and it was but slightly discoloured. The stricture was dilated directly upwards, and with Mr. Cooper's history; the bowel was retained with great care, and the patient expressed himself relieved. The wound was united by three sutures; the testicle maintained the same situation as before the operation. The patient was put to bed, comparatively easy; was immediately bled 24 oz., and ordered to take small doses of *sulph. mag.* every two hours, until an evacuation was procured.

Three o'clock, p. m. Patient comfortable; pulse 120, small and rather hard; has very slight pain in the belly; trifling nausea; hands and feet cold; sweats much over the body; has an inclination for stool.

Four o'clock, p. m. Complains of great pain in the loins; has not been sick; has taken another dose of the opening medicine; had no stool; pulse very quick, but soft; tongue a little furred and moist; skin cool; no pain in the part; feels a disposition to have a motion.

Six o'clock, p. m. Bowels relieved; had two or three motions, and feels much better; nausea not so great; no pain in the bowels; skin cool; hands warmer, but feet very cold; pulse very quick; great thirst.

Seven o'clock. Has taken another dose of medicine; is sick, and vomits a bilious matter.

Thirty minutes past seven o'clock. Has vomited much; is more easy; inclined to sleep; one more motion.

Fifteen minutes past eight o'clock. Took another dose of medicine; ordered abdomen to be fomented; pulse very quick.

Nine o'clock. Patient lying on the right side; is more easy; has been very faint; is now better.

Thirty minutes past nine o'clock. Has frequent stools; sickness and vomiting ceased; no pain on pressure of the abdomen; feet very cold; ordered hot bottles to them, and to take a pill of calomel and opium.

Forty-five minutes past ten o'clock. No pain in the belly; pulse very small, quick, and vibrating; hands and feet extremely cold; body in profuse perspiration; some sickness, but has not vomited; immoderately purged. Tinct. *opii*: 40 gtt.

Twelve o'clock at night. Patient very restless, and wishing to change situation often; has no pain whatever, but complains of great sense of lowness and debility, still he is able to turn himself in his bed, and to spit forcibly from the mouth; vomits frequently a thin and dark fluid; has frequent stools; pulse not to be discerned at the wrist; hands and feet perfectly cold; clammy sweat over the surface of the body; countenance pale and very anxious.

Thirty minutes past twelve o'clock. Vomiting increased, and great sense of exhaustion, with much restlessness; slight convulsion of the upper extremities; is insensible; stools came away involuntarily; abdomen more tense; the dressings raised; wound looks well; no protrusion.

Forty-five minutes past twelve o'clock, a. m. Patient died. Strength and all the powers of life subsided in the most gradual manner possible, and the patient sunk away as into a deep sleep; he moaned much before death.

Appearances upon dissection.—Abdomen tumid and very tense, with considerable discolouration; the lips of the wound were in close contact, and when the sutures were cut out, the surface of the tunica vaginalis was seen slightly inflamed, as also that of the testicle, which was at the lower part of the inguinal canal; the finger could be passed readily through the external ring, some distance down into the scrotum; *the hernial sac was seen protruding into the cavity of the tunica vaginalis*, and the opening made into it was about three quarters of an inch; the surface was inflamed. The tunica vaginalis could be traced up to the neck of the sac all around it; the spermatic cord was upon the inner side of the sac.

The abdomen being opened, the omentum was seen passing down as far as the umbilical region, where it stopped in the left side, but continued on the right side to pass down to the inguinal region, and was traced into the sac, at the neck of which it was closely adhering; the vessels of the omentum could be seen slightly turgid; the small intestines were much inflated, the vessels in them were also turgid in some parts, but there was considerable inflammation of the ileon about twelve inches in extent from the valve of the colon; the peritoneal coat could easily be broken down with the fingers—not so the muscular coat which was firm; the portion of intestine strangulated was ileon about eight inches from the valve, it presented a rough surface about the size of a sixpence, which had adhered most firmly to the inner part of the sac; the intestine at this place was slightly adhering to the peritonæum near the mouth of the sac, but was removed without force; the ascending colon was much distended; the intestines did not contain any feculent matter scarcely; the stomach was in its natural situation; the liver was natural; the gall bladder was very much distended, and the transudation was very great; there was very slight effusion into the cavity of the peritonæum; there was no peritoneal inflammation; all the other viscera were natural, and in a healthy state; the epigastric artery was in the usual situation. The testicle on the left side was readily passed through the external ring into the groin; upon opening the tunica vaginalis there escaped about two drachms of straw-coloured fluid; the surfaces of the tunica vaginalis were considerably separated, and the cavity extensive, but the upper part was firmly and decidedly sealed, having no connection whatever with the abdomen. The testicle was healthy and of the natural size; that on the right will be remembered to have been much smaller than natural.*

The imperfect descent of the testicle often accompanies this kind of hernia, and the tumour appears to take the direction of the inguinal canal. Mr. Dalrymple has favoured me with a description of parts resembling those found in Mr. Lucas's case, but the form of the swelling was peculiar, and the contents of the sac were found to be the cœcum and a portion of colon.†

James Mellowship, aged eighteen years, by trade a coach-joiner, came to the Norfolk and Norwich Infirmary, at one o'clock, p.m., on the 23rd of December, 1812. He has symptoms of strangulated hernia. There is, in the right iliac region, an oblong tumour full four inches long, commencing at about a quarter of an inch below the superior anterior spinous process of the ilium, and proceeding, with a very slight degree of obliquity downwards, to about the same distance beyond and a little above the tuberosity of the right os pubis. The tumour is very prominent and tense; it suddenly made its appearance at about eight o'clock a.m., whilst the lad was at his work; symptoms of strangulation immediately followed. He says that ten years ago he had a similar attack; that the swelling then subsided spontaneously, and that he recovered speedily without professional assistance. The case is rendered interesting by the situation and direction of the tumour; it is called a femoral hernia, but certainly it is not a *femoral* rupture. The habit of body of the patient is extremely thin, and Poupart's ligament, with the sheath containing the great femoral vessels passing under it, can be distinctly felt and seen lying at nearly the distance of half an inch beneath the inferior line of the swelling; I think I can also feel the external abdominal ring in its situation, but there are no spermatic vessels. There is no testicle in this side of the scrotum; the left testicle is in its place.

Case.

Tobacco clysters were injected, and the Taxis was tried in vain. At four o'clock p.m. a consultation directed the operation to be performed; it was done immediately by the surgeon of the week.

An incision was made through the integuments, beginning at the upper extremity of the tumour and continued obliquely downwards, until it reached nearly to the symphysis pubis. The integuments being then separated from the subjacent parts, a stratum of dense tendinous fibres, running in the direction of the fibres of the aponeurosis of the external oblique muscle, was exposed. These fibres, on being divided, were found to have covered a genuine herniary sac, containing, along with an unusual quantity of serous fluid, a small portion of omentum, the cœcum with the exception of its appendix vermiformis which was not prolapsed, and six or eight inches of colon lying in contact with the testicle, covered only by its tunica albuginea. The testicle lay at the lowermost part of the sac, at the left or inner side of the knuckle of colon; its vessels being situated throughout their whole course at the inner or mesial side of the sac. The most depending portion of the herniary sac was, I think, at least half an inch above the level of the tuberosity of the os pubis. The direction downwards of the whole tumour was nearly that of the tendinous fibres which intersect the columns of tendon of the external oblique muscle, having but little more of obliquity in its descent. The opening through which the strangulated parts descended was nearly in the situation of the internal or posterior abdominal ring; its edges were smooth and rounded, and I suspect, by its appearance, that it was not of recent origin; the stricture which it formed was very firm; the end of a director was, with difficulty, introduced; upon

* Mr. Ranking, surgeon at Hastings, communicated to me a similar case, in which strangulation of its contents required the operation. The subject of the complaint was a man, aged twenty-eight, who had been troubled with a rupture for four years, brought on by running suddenly against a post. The testicle on that side had never descended. The tumour at the external ring was very small; but above the ring, in the inguinal canal, it resembled in shape and size a duck's egg. On laying open the inguinal canal, and cutting into the sac, the intestine was seen in the tunica vaginalis lying in contact with the testicle, which had extended as far as the external ring. The quantity of fluid that escaped during and after the operation amounted nearly to four pints; it continued to flow for two hours. The stricture was at the internal ring, and very high up, and was divided upwards and outwards, as the epigastric artery was known to be on its inner side. No untoward symptom occurred after the operation.—Ed.

† Sandifort, alludes to the great variety in the situation which the cœcum occupies in the abdomen, and explains the frequency of its forming part of the contents a hernia. Several cases have occurred of this intestine being found in an inguinal hernia on the right side, from its loose abdominal connexions; but it has rarely fallen to the lot of surgeons to meet with it in a hernia in the left side of the scrotum, of which Sandifort relates an instance in a child of six months old, that died at Leyden, whom he inspected.—Ed.

this it was divided directly upwards, and the prolapsed parts reduced; a finger was then introduced, and found to pass directly into the cavity of the belly. The parts divided in the operation healed by the first intention. The patient recovered rapidly.

Case.

Nearly twenty years ago I was called by Mr. Kent, now surgeon in Southwark, to see Mr. Atwood, who had been from birth troubled with a hernia, and which had recently become irreducible, and attended with symptoms of strangulation. Mr. Kent having in vain tried to reduce by the aid of the usual remedies, and finding that I could make no impression on the tumour, which just protruded at the external ring, I proposed the operation, to which Mr. A. consented. Having laid bare the external ring and opened the sac, I passed my finger up towards the spine of the ilium, and finding that there was no stricture at the external ring, I laid open the inguinal canal, and found a small knuckle of intestine concealed within the canal, and a small quantity of fluid occupied the lower part of the tumour, which escaped on opening the sac. On raising the intestine the testicle was exposed to view, inclosed in its tunica vaginalis, which in this case formed the hernial sac. I divided the stricture, which was very high up at the inner ring, and returned the intestine, leaving the testicle in the inguinal canal. Mr. A. speedily recovered.

Hydrocele of the spermatic cord.

I lately operated on a child aged five years, who had a large watery tumour in the scrotum, extending down from the scrotum to the upper part of the testicle. The tumour being laid open, the testis was found separated from it by a distinct adhesion, but the fluid appeared to be contained in the tunica vaginalis, and extended through the ring to the opening from the abdomen which was now closed. This boy had worn a truss for a congenital hernia.*

Operation for the congenital hernia.

When the hernia is strangulated, the same means are to be employed for its reduction as in the inguinal hernia; but if these do not succeed the operation becomes necessary, which in some respects differs from that for the common inguinal. The incision should begin at the upper part of the abdominal ring; and in large herniæ should extend to a little above the testis. This lays bare the fascia and cremaster muscle, which cover the tunica vaginalis. This latter membrane is then to be cautiously opened, and divided in the same direction as the first incision, to within an inch of the abdominal ring upwards; but downwards no lower than the upper part of the testicle, as a sufficient quantity of the tunica vaginalis should be left to cover this organ. The finger being passed within the tunica vaginalis, which is here the only sac of the hernia, the seat of the stricture should be felt for, and, if at the ring, the dilatation should be made by insinuating the knife between the sac and the ring.

In hernia congenita the stricture is much oftener found to be within the sac, than in the ordinary kinds of hernia. The adhesions which may have existed at the mouth of the sac, or partial adhesions within the cavity of the tunica vaginalis, may cause strangulation by pressure, or may entangle the intestine, and thus produce all the symptoms of strangulation. Mr. Hodgson, of Lewes, communicated to me a case on which he was called upon to operate, where he found the stricture low down in the sac; his words are as follow: "Upon opening the sac I found the lower portion of the intestine apparently adhering to the inferior part of the sac. Upon examination a fold of it, about three quarters of an inch in length, was found strangulated within an aperture of the tunica vaginalis, from which it was readily disentangled without dividing the stricture. The intestine appeared to have suffered more from this stricture than from the ring."

If the impediment to the return of the hernia is formed by the transversalis muscle, the knife (still in the anterior side of the sac), is to be carried up to it through the ring; but if the stricture is in the tunica vaginalis itself, at its orifice into the abdomen, the knife must be introduced within it, and the strictured part cautiously divided.

The injunction usually given of dilating upwards and outwards towards the ilium, to avoid the epigastric artery, is always safe in this hernia, because that artery passes on the posterior and inner side of the tunica vaginalis; but it is equally safe to dilate directly upwards, opposite the middle and superior part of the tunica vaginalis; and therefore, to preserve an uniformity in the mode of performing the operation, it is better to pursue this direction in the dilatation.

Large congenital hernia.

If the congenital hernia is large, and more especially if it has been for any length of time irreducible, I should advise the return of the parts without inspection, if the stricture can be removed without opening the tunica vaginalis. In plate 11, fig. 3, will be seen a long-existing congenital hernia, which had been of very large size, and the abdomen was much contracted: in the attempt to return the intestine it burst; the fæces were discharged through the opening, at which the bougie was introduced, and the man survived only a few days. But there is a

* A portion of the tunica vaginalis between the internal ring and the testicle sometimes remains open, in which water collects, and, by distending the tunic, separates the adhesions at its mouth, and thus gives rise to a hernia. A gentleman was brought to me by Mr. Gaselee, with a transparent hydrocele extending from the upper part of the testicle into the inguinal canal; the fluid could be forced into the canal, but could not be made to enter the abdominal cavity. The tumour being small and not tense, it was proposed that he should wait until it became more distended, when it could be injected more easily. In about six months he called on me again; when upon examination, instead of a hydrocele, I found the cavity occupied by intestine, which could be returned into the abdomen. The adhesions at the orifice of the tunica vaginalis having probably been separated, the fluid passed into the abdominal cavity, and was replaced by a descent of intestine.—ED.

still greater reason for reduction without opening the tunica vaginalis, if the intestine has contracted an adhesion to this membrane. I know of no operation in surgery so difficult as that of detaching a congenital hernia which is closely agglutinated to the tunica vaginalis. The adhesions are too short to be safely cut through, the tunica vaginalis cannot be returned into the cavity of the abdomen, nor can any portion of it be cut away at its posterior part without endangering the spermatic vessels. All these difficulties are removed by dividing the edge of the abdominal ring and transversalis muscle without opening the tunica vaginalis; or if this proves insufficient, which is rarely the case, the tunic should only be opened at the abdominal ring, or at the upper orifice into the abdomen, wherever the stricture exists, and dissected so as to set free the strangulation, after which the edges of the wound should be brought together and united by the first intention. The strangulating compression being thus removed from the viscera, they still remain in the same situation, and irreducible, and must afterwards be permanently supported by a bag truss.

Mr. Fixot, of Jersey, however, met with a case in which he performed the operation of separating the adhesions, which were very extensive, and the patient recovered. The following is the account of the operation as described by Mr. F.

On the evening of July 12th, I was sent for to visit Mr. Charles Pinel, a gentleman of Trinity parish in this island, in consultation with Mr. Le Gros, surgeon. On my arrival Mr. Le Gros informed me that Mr. P. was afflicted with a strangulated hernia, that he had repeatedly attempted to reduce, but to no purpose; he had tried cathartics and fomentations, and had been unsuccessful for thirty-six hours; his pulse was 96, full. I next examined the tumour and attempted reduction; the hernia I found to be enterocele. Warm bath and venesection and salts were adopted without success; suspension by the feet and shaking him were the next; tobacco injection and cold affusion on the scrotum were likewise tried without success. Every trial having proved unsuccessful, being asked by his wife if I thought any chance remained from apparent circumstances, I told her none remained but the operation. Not the least fluid appeared contained in the sac, which gave me reason to apprehend that adhesions had taken place. I told her that being young in practice I would not advise nor operate until further surgical advice was obtained. Accordingly two more surgeons were sent for, one came, the other being indisposed. The pulse had now risen again, and Mr. Marsh, surgeon to the 58th regiment of foot, was for trying a scruple of calomel every two hours, and tobacco injections repeated at the same time; this was early on the morning of the 13th. Mr. M.'s proposals being acceded to we left Mr. Le Gros with Mr. P., to put them in practice. About four o'clock in the afternoon of the same day they again sent for me, desiring I would go immediately as he was very weak, and they thought he had but few hours to live. I called Mr. Marsh on my way, and we proceeded. The constant vomiting had prevented his taking the calomel and injections exactly as was ordered; we now found his pulse weak, and apparent symptoms of mortification taking place. The operation was proposed, and he submitted. It falling to my lot to perform it I had him removed into a more spacious room for the benefit of more air, the weather being then excessively hot. Having placed him in the usual position I began my incision an inch and a half above the abdominal ring, and continued it downwards about eight inches to the bottom of the scrotum. The sac was carefully dissected for, and on opening it no fluid was found. The intestine was discoloured but not mortified; it was found extending about eight inches in length, and the sac firmly adhering to it throughout; the testis on that side was wasted. The adhesions having been carefully dissected, I next proceeded to divide the ring, but to my surprise found no more possibility of returning it than I did before, the adhesions extending so far as to oblige me to carry my incision one inch obliquely higher up, when with care and a little trouble I succeeded in returning it. The rest was completed with sutures and T bandage; pulse 120; a cathartic was administered, which operated well during the night, and the next morning he appeared cheerful and free from pain. From this to the 23rd he was kept on low diet (his pulse varying since the operation from 120 to 130, small); the discharge being now great a more generous one was substituted; wine and bark were given. His pulse now diminished in number and increased in force, and he continued doing well, when on the 2nd of September the wound was perfectly healed.*

Encysted Hernia of the Tunica Vaginalis.

A variety of hernia congenita occasionally presents itself, which if not understood might considerably embarrass a surgeon. On opening the tunica vaginalis, instead of the intestine being found lying in contact with the testicle, a second bag or sac is seen inclosed in the tunica vaginalis, and enveloping the intestine. This bag is attached to the orifice of the tunica vaginalis, and descends from thence into its cavity; it generally contracts a few adhesions to the tunica vaginalis, while its interior bears the character of a common hernial sac.

The idea which I have formed of the nature of this variety of hernia is, that the tunica vaginalis, after the descent of the testis, becomes closed opposite the abdominal ring, but remains open above and below it. The intestine descends into the upper part, and elongates both the adhesion and tunica vaginalis, so as to form it into a bag, which descending into the tunica vaginalis below the adhesion, and becoming narrow at its neck, though

* Mr. Lawrence relates a case in which he found "the hernial sac half way between the testes and groin so contracted, that a probe only would pass into the stricture; and the prolapsed parts experienced in this situation as close a constriction as that which they suffered from the margin of the ring. This unexpected circumstance was at first rather embarrassing, for as the upper division of the sac was first opened, and the communication, in consequence of the closeness of the contraction, could not be immediately discovered, a doubt arose as to the nature of the lower part of the swelling."—p. 505, *Op. Cit.*—Ed.

wide at its fundus, receives a portion of intestine, which in the following case was too large either to be returned into the abdomen, or to retain its functions whilst it continued in the sac.

Appearance of.

This disease does not appear like a hernia of the tunica vaginalis, as the testis is not involved in it, but can be distinctly perceived below it. Some embarrassment will be produced in the operation if the surgeon does not open the tunica vaginalis very freely, so as to completely expose the parts. The strangulation arises from the contracted state of the mouth of the hernial sac, which may be very safely divided upwards.

The first case of the kind, which has come to my knowledge, was one that occurred in Guy's Hospital in the year 1801, under my late colleague Mr. Forster, who was kind enough to give me the following description of it.

Dear Sir,

As you communicated to me your intention of publishing a work on the varieties of abdominal herniæ, I flatter myself that the subjoined case, which came under my care in January, 1801, will prove a valuable addition to your collection, as it appeared upon dissection to be connected with circumstances so very unusual, that I have never seen or read of a similar case.* It is accompanied with drawings, which I executed whilst the parts were in a recent state, of which I made a preparation, now in my possession.

I am, dear Sir,

Your most obedient humble servant and colleague,

Southampton Street, Bloomsbury Square.

THOMPSON FORSTER,

Senior Surgeon of Guy's Hospital.

Case.

William Chadwick, a shoemaker, aged thirty-one years, of a spare habit, was admitted into Guy's Hospital, under my care, on the 31st of January, 1801. He complained of great pain in his right groin, which was tense and painful to the touch; he had great anxiety of countenance, singultus and subsultus tendinum. I learnt that, thirty-six hours previous to his admission into the hospital, during a fit of coughing, he was seized with an acute pain in the groin, and on examination I discovered a small tumour just below the abdominal ring, and extending about three inches into the scrotum. I adopted every plan my experience could suggest for the reduction of this tumour, but all my efforts proved fruitless; and as the symptoms were of the most urgent nature, and the life of my patient in such imminent danger, I considered any further delay as improper, and proposed an operation as being the only probable means of saving his life; to this, however, he objected, and he died the following day.

On dissection the following were the appearances. When the scrotum was divided the tumour was brought in view, taking the course of the spermatic cord, evidently involved with it, and much contracted at the ring. On investigating further, and cutting carefully through the tunica vaginalis of the cord near the ring, a fluid escaped. I then continued the incision to the bottom of the scrotum, through the tunica vaginalis of the cord, and the tunica vaginalis testis, which I now found to be one cavity, the edges of which being turned back on either side, exposed a hernial sac pendent from the ring, and descending towards the testicle.

From hence it evidently appeared that the hernial sac, and its contents, were contained in the tunica vaginalis of the spermatic cord, which formed only one cavity up to the ring. On opening the hernial sac, it was found to contain a portion of small intestine, of a claret colour, and in a mortified state.

Since the former edition of this work, in addition to the above case of Mr. Lucas, which I suspect to have been of this kind, two similar cases have presented themselves in Guy's Hospital; one was the subject of operation on account of strangulation; the other was accidentally met with in dissection, and is preserved in the museum. Mr. Wagner has communicated to me, from notes he made at the time, the following particulars of the case which required the operation of dividing the stricture.

Case.

John Bossom, tanner, aged twenty-nine years, was admitted into Guy's Hospital, by one of Mr. Forster's dressers, about forty-five minutes past ten, a. m., on Sunday, June 30th, 1816, with a strangulated congenital hernia on the right side.

The patient recollects to have had a rupture all his life, and has worn a truss for twelve years past; accident occasioned him to work without it for the last week, during which time the rupture occasionally came down, but was readily reduced by himself. He had a stool on Saturday morning at six o'clock, after which he went to work as usual, and making some little exertion the rupture came down with violence, and has not been returned since, which was about seven o'clock, a. m.

The patient soon complained of pain across the abdomen, with much sickness and vomiting; soreness at the abdominal ring, and no stool from the bowels. A surgeon was called in and the Taxis used; he lost in the course of the day (Saturday) about sixty ounces of blood. He was put into the warm bath, and cold had also been applied to the scrotum, all without effect.

Upon admission into the hospital he had no urgent symptoms; he had a disposition to evacuate his bowels, but could pass nothing; the pulse was full and hard, the skin hot and dry, with great anxiety of countenance. He was ordered immediately into the recumbent posture, with the thighs flexed upon the trunk and knees approaching each other very nearly, the shoulders a little elevated, and the Taxis tried for twenty minutes steadily. Small doses of the tart: antim: were given at short and repeated intervals, and the Taxis attempted while the patient was under the influence of the medicine, but without any apparent diminution of the tumour, which was very large. The integuments of the penis and opposite side of the scrotum were œdematous; the scrotum was not at all discoloured; the testicle on the right side could not be felt. The patient was put into the warm bath, bled to twelve ounces, and was continued in it for thirty minutes without producing faintness or a reduction of the swelling; the Taxis was used, it gave but little pain. When the patient

* Mr. Hey's book was not then published.

was raised up to be put into the chair he fainted, upon which he was inclined into the recumbent posture, and the Taxis used in the fainting state, but without success. The patient was again put to bed, and the tobacco enema ordered, half of which was thrown up the rectum at thirty-five minutes past twelve o'clock, but without much effect upon the system; in thirty minutes more the remaining half was thrown up, and in a short time the patient had profuse perspiration break out, felt an unpleasant debilitating sensation, vomited, and a partial loss of muscular motion, with great relaxation, followed. Advantage was taken by Mr. Wickinden, the dresser, to employ the Taxis, which he certainly did very judiciously, but without effect; the patient was left alone for a few hours. He had no urgent symptoms now, except that he has had no stool and feels a soreness at the abdominal ring, with slight pain in the abdomen on pressure. Mr. Forster saw the patient at six o'clock, p. m., and determined upon the operation immediately. The pubes and scrotum being shaved he commenced his external incision through the integuments opposite the abdominal ring, and extended it about one third of the swelling downwards. A few touches with the knife divided the cellular membrane; his next cut was into the hernial sac, and about an inch in extent; into this opening he introduced his finger its whole length, and dilated the sac with the scalpel; here was exposed not intestine or omentum, but intestine enveloped in a covering, through which its dark colour was easily discovered. A small opening had been made into this covering of the bowel by the incision into the sac; into this hole Mr. Forster introduced his finger and tore it down, at which time the intestine was exposed. No water escaped at any time. Two convolutions of intestine (ilion probably) were contained within the hernial sac, and appeared to be about nine inches in extent. The bowel was of dark colour, shewing only a delay of circulation, but was healthy in all other respects; it contained some feculent matter and much flatus. The stricture upon examination was found to be at the external ring, and could not be dilated until the external incision was extended above; it was then dilated directly upwards with the probe-pointed bistoury, passed upon the finger into the ring. There were slight adhesions at the neck of the sac, which were easily overcome by the finger. The reduction of the bowel was tedious, because the surgeon did not take the precaution to press out its contents; with some difficulty the bowel passed into the abdomen. Here then were exposed testicle at the back part of the sac; the shining, smooth, and dense appearances of the tunica vaginalis, in the cavity of which lay a portion of what immediately covered the intestine, and which Mr. Forster tore through in the operation before he exposed the bowel; it had the appearance of a membrane, vascular and so thin, that, as I have already observed, the intestine was seen through it; before it was divided the tunica vaginalis was recognized. The testicle was less than the natural size.

The wound was brought together by one suture in the middle, which did not include the tunica vaginalis, and by adhesive straps above and below. A pledget of tow was put over the whole, and a T bandage applied.

The patient was put to bed, and felt himself perfectly easy. He was ordered an enema with the oil of ricini, if he did not have a stool in two hours.

Eight o'clock, p. m. Patient has been asleep half an hour, and is now asleep.

Thirty minutes past eleven o'clock, p. m. Patient had slept three hours, and is much refreshed. An enema was given which produced an evacuation which was small in quantity, of dark colour, and in round balls. The skin is hot and dry, with some thirst; pulse 115, full and hard; has no pain in the abdomen on pressure, but occasionally a sharp pain in the wound; has made water.

July 1st, ten o'clock, a. m. The patient has had a comfortable night; has been in no pain; has had five or six stools after taking a large dose of oil of ricini at twelve o'clock in the night; the stools are of natural colour and appearance. The patient has no pain in the abdomen, but soreness in the wound; face flushed; has some thirst, and tongue furred and white; pulse full and strong, and 95 in a minute.

Two o'clock, p. m. Skin hot and dry; face flushed; is thirsty; pulse full and strong, but not so hard as in the morning, is 98 strokes in a minute; had another stool.

At night, forty-five minutes past twelve o'clock. Patient asleep; has had another stool; has been very comfortable all the afternoon and evening.

July 2nd. Symptoms not materially altered; patient doing well.

July 3rd. The patient has had a very restless night; has had a pain in the back and loins from lying in the same position. Scrotum very much increased in size, is tense and painful to the touch, with slight blush of inflammation on the surface; a slight swelling occurs also in the course of the incision. The white wash was ordered to be applied over the scrotum, and to take oil of ricini; the pulse 105, full and strong, but easily compressed; skin hot and dry; tongue white and furred, with some thirst; no pain on pressure of the abdomen.

Thirty minutes past eleven o'clock, a. m. The patient ordered to be bled twelve ounces, which produced faintness and great dejection of countenance; the pulse was after the bleeding 115, but not so full and strong.

Three o'clock, p. m. Patient is now asleep; the tumour of the scrotum is lessened, and the patient has been more comfortable.

July 8th. The patient has been doing well during the intervening days; has had no alarming symptoms; the tumour of the scrotum very much diminished, but there still remains much tension of the tunica vaginalis. The wound has healed by the first intention, and the patient is doing in all respects well. His strength improves fast.

The late Mr. Burns, of Glasgow, sent me the following communication relative to the subject of inguinal hernia in the female; and also a dissection of a crural hernia, from which a drawing is made and engraved in plate 11, fig. 4, part 2nd.

The specimen of hernia, of which you now receive a drawing, was met with in the body of an aged female brought to the room last August for dissection. We were ignorant of the previous history of the woman, and have never been able to ascertain the immediate cause of death. On looking at the subject I perceived a slight fulness in each groin, and in the bend of both thighs. By pressing upon the abdomen, which contained a small quantity of fluid, I rendered these tumours much more distinct. This led me to examine the body carefully, when I discovered the person had inguinal and crural herniæ on both sides.

Mr. Allan Burn's communication.

The inguinal herniæ were both of the congenite species, but still in their nature they were somewhat peculiar; for on both sides the inguinal canal was fully as large as it is usually met with in the male, and beside was so very short, that it presented when dissected

almost the appearance of a mere aperture. The round ligament of the womb was enveloped in a distinct tunica vaginalis, and in this the gut lay, the ligament bearing the same relation to the intestine, that the spermatic cord does in the other sex. On the right side the herniary sac was about two inches in length, and in shape resembled a Florence flask, the bulbous extremity expanding from the lower orifice of the canal, was contained in the upper part of the thigh, lying more in the course of crural than of inguinal hernia. This direction of the tumour in inguinal hernia in females has been noticed by several authors. Dr. William Hamilton, the late ingenious Professor of Anatomy in this University, met with several cases of this kind; and Mr. Astley Cooper mentions, in his work on hernia, examples of a similar nature. By dissection we ascertained the cause of the deviation from the usual direction of the tumour to be a premature separation from each other of the external pillars of the inguinal canal. Where the inguinal canal is imperfectly formed, it is generally owing to the incomplete extension of the posterior or internal edge of the ring. When this happens, the internal orifice of the canal is brought nearer to the pubes than it ought to be; but when the imperfection is produced by a premature separation of the external pillars, then by dissection we find the internal orifice in its proper place, but the external outlet is removed from the pubes. In the first instance, when the herniary tumour protrudes, it lies just over the tubercle of the pubes, and follows the course of the spermatic cord into the scrotum, while in the latter it lies nearer to the spine of the ilium, is seated just over the crural foramen, and by extension descends along the thigh, counterfeiting the appearance of femoral rupture. By attention, however, it is readily distinguished from the latter by being felt lying over the crural arch, above the tubercle of the pubes.

When describing figure 2d of the Sketches in the Edinburgh Medical Journal, I mentioned that a fillet originates from the upper pillar of the inguinal canal, which winds round the fascia of the adductor muscles, incorporating itself with the fascia as it passes along, and reaching in some instances even to the gluteus tendon, to which it is finally attached. It is always intimately connected with the fascia, originating from the aponeurosis of the oblique muscle, and investing the tunica vaginalis. The action of this band upon the sac was clearly illustrated in the present case; for by its pressure an indentation was formed in the neck of the sac. Now this is a piece of anatomy which ought carefully to be studied with a reference to practice; for whoever is ignorant of the position and connection of this production from the upper pillar of the ring, must possess but a very confined notion of its action in disease. By a knowledge of the conformation of the pillars of the ring, we are led to an acquaintance with the effects of each other upon the spermatic cord, and are taught that, when by compression upon the abdomen we tend to dilate the aperture through which the cord passes, the pillars of the ring (in the fœtus or new-born child) react upon the contained cord, embrace it closely, and thus effectually prevent the passage of any of the bowels. When however the force is still greater, when a portion of the gut does escape, then we know that we have it in our power in some degree to obviate the mechanical obstacles to the return of the bowel; for, by recollecting that the upper pillar sends off this fillet to decussate the insertion of the lower fasciculus, and to course along the internal part of the thigh, it follows from this that the gut must be more acted on in one position of the limb than in another. By rolling the toes inward, if we at the same time extend the hip joint, this band comes to be very much put on the stretch, it is depressed, and thus to approach toward the lower pillar, and firmly to embrace whatever is placed between these columnæ. Of consequence, when any of the abdominal contents are displaced, its influence, if not contracted by the employment of artifice, tends to bind the protruded part firmly to its unnatural position; and thus we sometimes see one practitioner foiled in his attempts to reduce the hernia, and another afterward, by moving the limb in opposite direction, readily succeed. Every surgeon ought to know this cause of difficulty, for it informs him that rolling the toes outward, and at the same time crossing the thigh of the affected side over the opposite, will, if genuflexion have been premised, remove as completely as possible all adventitious pressure from the protruded parts, and thus indirectly facilitate reduction.

With regard to the crural hernia, we found a peculiar disposition of Gimbernat's duplicature; the formation was not, however, exactly alike on both sides. On the left, of which I have sent a drawing, the crescentic duplicature was pushed out so as to form an enclose for the peritoneal herniary sac. In order to understand how this appearance was produced, we have to recollect that in some cases a septum is stretched across the crural aperture, being merely a small perforation in the centre. When pressure is applied to this septum, it is protruded, assumes the form of a capsule containing the herniary sac, and has a small opening in its extreme point. Over the upper and outer edge of the protruded duplicature lay the falciform process of the fascia vera; but in this instance it is obvious that the fascia might have been divided, without in any degree removing the cause of strangulation.

On the right side the crescentic fold was also protruded; but here the lower cornu passed behind the femoral vein; the upper ran anterior to it. Afterward both horns attached themselves to the sheath of the femoral artery, or to that septum which separates the great artery from the vein. The falciform process on this side lay over the anterior horn of the protruded duplicature, and followed its course; consequently there was an appearance of two falciform processes, which is not uncommon, and both were in contact, and both must have been divided at once; and thus the arch must have been considerably relaxed, and the cause of strangulation removed.*

* The changes which the tunica vaginalis undergoes after the descent of the testicle, and the appearance which it exhibits in different subjects, are well shewn in M. Cloquet's *Recherches Anatomiques*, in reference to the formation of congenital hernia and hydrocele of the spermatic cord. The junction of the tunica vaginalis with the peritoneal cavity is marked by a depression situate five or six lines to the outer side of the opening of the fascia transversalis, and exists not only in the male but is found also in the female. In the latter the peritoneum often forms a small canal upon the fore part of the round ligament, and from its first discoverer is called Nuck's canal. This canal sometimes presents itself under the form of a cylindrical tube, ending in a point or a round *cul de sac*, varying in length and size. Sometimes, on the contrary, it appears as a kind of little pouch with a narrow neck which communicates with the abdomen. Its parietes always adhere closely to the round ligament; sometimes this prolongation of peritoneum admits only a probe, in other subjects it will readily admit the extremity of the little finger. He has met it not only in the female fœtus, but also in young girls and women of all ages.—*Recherch. Anat.* p. 41.

The existence of this canal gives rise to congenital hernia in the female; at least it may be presumed that the inguinal hernia which appears in very young girls is a descent into this elongated pouch of peritoneum, corresponding to the tunica vaginalis of the male. The frequent occurrence of inguinal hernia in girls, compared with its rare appearance in the adult female, would appear to admit of no other explanation. M. Dupuytren informs me, as the result of his observations, that the proportion of inguinal to femoral hernia in girls is about two to fifteen—Ed. *fifteen of the former to two of the latter*.

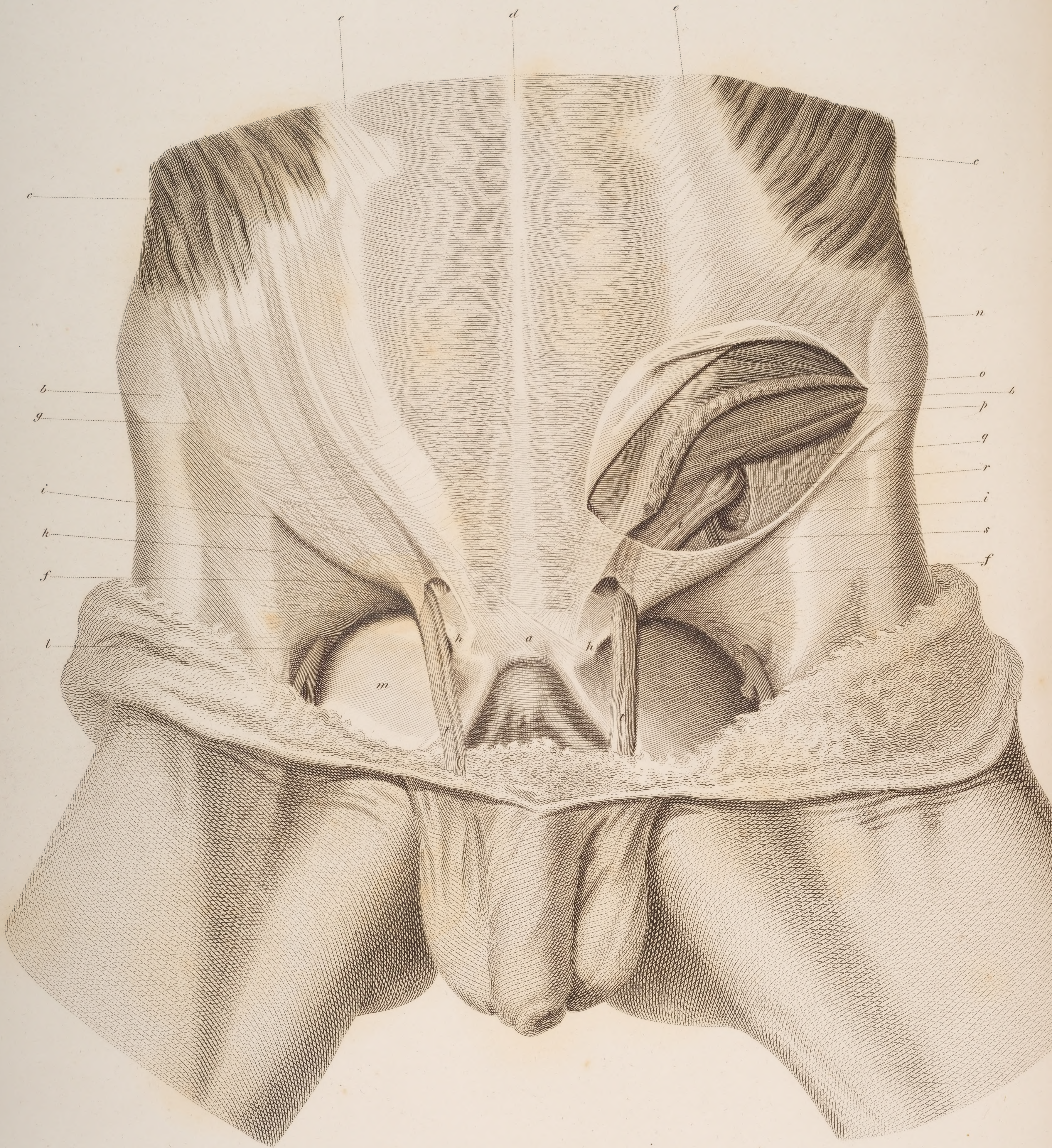
The following case exhibits an instance of a pouch forming at the mouth of the tunica vaginalis, in consequence of partial adhesions of the membrane. The intestine, which had descended into the scrotum, was returned by the taxis; but the symptoms of strangulation still continuing unabated, an incision was made into the sac to release any portion of intestine that might remain at the internal ring; but the operator was unable to discover any protrusion. On examination, a portion of gut was found strangulated in a pouch within the abdomen at the orifice of the sac.*

* Thomas Harding, aged fifty-eight, was admitted into Guy's Hospital on the 26th of June, 1825, at nine o'clock in the morning, with a scrotal hernia on the right side, and labouring under all the symptoms of strangulation. He stated that for several years he had been troubled by the frequent descent of a hernia, which he was sometimes able to reduce himself, but had often been compelled to have recourse to medical assistance. The hernia had descended the evening before, when he sent for a surgeon who bled him largely and made frequent attempts at reduction, all of which were unsuccessful. At the time of his admission he laboured under violent pain in the epigastric region, vomiting and occasional hiccough; his pulse quick and small. Mr. Morgan, having placed the patient in a favourable position, returned the hernia with great ease by a very gentle application of the taxis. Common injections were ordered to clear his bowels, and he was put to bed. On visiting the patient the next morning no abatement of the symptoms was found to have taken place. The enemata had returned with a very small quantity of feculent matter; his pulse was 98, small and wiry; his tongue somewhat furred; his abdomen was tense and tender, for which leeches and fomentations had been applied. On careful examination, a small tumour was perceptible in the course of the inguinal canal. He was ordered to lose 12 oz. of blood; a blister was applied to his abdomen, and the purgative injections were repeated. Some castor oil which was given to him he immediately rejected. Notwithstanding the exhibition of these remedies, not the slightest amelioration of the symptoms was produced; they continued to be very distressing during the night, and the next morning he was evidently worse. Mr. Morgan, considering that a stricture still existed in some part of the intestine, proposed an operation, to which the man consented. After dividing the integuments, superficial fascia, and cremaster in the usual manner, what appeared to be the hernial sac was brought into view; this was laid open, and on the operator introducing his finger it readily passed through the external ring into the inguinal canal; here an unnatural projection could be felt, but no intestine was found, nor could the finger be passed into the abdomen. The inguinal canal was then exposed by slitting up the tendon of the external oblique, and the sac before mentioned was more extensively opened, still no intestine could be found, and no communication appeared to exist between the sac and the abdominal cavity. A substance was felt in the canal which resembled a thickening of the cord. Under all these circumstances, it being considered hazardous to pursue the investigation any further as no hernia could be found, the wound was closed and the patient put to bed.

The patient was ordered to take a grain of opium and one of calomel every four hours. The constipation of the bowels, however, still continued, with the rest of the symptoms unabated. On the 29th his pulse was small and feeble, his belly distended, his countenance anxious and his extremities cold. He continued to grow gradually worse, and died early on the morning of the 30th, four days after his admission and the second from the operation.

On examination, it was found that the structure situated under the cremaster supposed to be the hernial sac, and opened as such, was the reflected portion of the tunica vaginalis, into the cavity of which the finger had been introduced, but was prevented from passing into the abdomen by a cause which will be presently seen. The tumour which was felt in the course of the inguinal canal was now discovered to be a hernial sac, situated behind the cord, and containing a portion of strangulated intestine of a very dark colour, and with a large gangrenous spot. The stricture of this hernia was situated at the mouth of the sac, behind the internal ring and opposite the lower part of its margin. The communication between the tunica vaginalis and the cavity of the abdomen was not closed, but the finger had been prevented from passing from the former into the latter by the pressure caused by the hernia. Just below the opening of the tunica vaginalis into the abdomen, was situated the mouth of a preternatural pouch, which extended downwards and inwards behind the fascia transversalis in the direction of the crural ring. It was into this pouch that a portion of the ileum had descended, and had there become strangulated. It seems probable that at the time of the man's admission into the hospital, a large portion of intestine had descended into the cavity of the tunica vaginalis, the cavity of which bore all the appearances of an old hernial sac. This, however, was easily returned, while the portion of bowel contained in the other pouch remained unreduced, and suffering under strangulation, caused the symptoms which ended in the patient's death.—Ed.

END OF PART I.



EXPLANATION OF PLATE THE FIRST.

THIS plate is intended to shew the insertions of the external oblique muscles, the formation of the abdominal rings, and of two of the fasciæ which are connected with Poupart's ligament, as well as the course of the spermatic cord under the edges of the internal oblique and transverse muscles, before it reaches the abdominal ring.

- a.* Symphysis pubis.
- b b.* Anterior and superior spinous process of the ilium.
- c c.* External oblique muscles.
- d.* Linea alba extending down to the symphysis pubis, and formed by the union of the tendinous fibres of the two oblique and transverse muscles.
- e e.* Lineæ semilunares, formed by the union of the tendinous fibres of the external and internal oblique and transverse muscles.
- f f.* The abdominal rings, formed by the separation of two columns of tendinous fibres; the upper inserted at *a* into each os pubis; the lower inserted into the pubes at *h*, after passing behind the spermatic cord.
- g.* The origin of some tendinous fibres which proceed from the anterior spinous process of the ilium, and crossing the columns of tendon, assist in uniting them above the abdominal ring.
- i i.* Poupart's ligament, or the crural arch, which is extended from the anterior spinous process of the ilium at *b*, to the pubes at *h*, receiving the lower column of tendon, which forms a part of the abdominal ring, and which passes behind the cord to be inserted from the spinous process to the crest of the pubes.
- k.* The fascia lata of the thigh, which is continued from Poupart's ligament, and seen turning in under the femoral vessels near the middle of the fore part of the thigh.
- l.* Is the saphæna major vein of the leg going through the fascia to enter the femoral vein.
- m.* Another part of the same fascia which arises from Poupart's ligament, and joins with the fascia lata, which it assists in forming.
- n.* The tendon of the external oblique muscle cut open to shew the parts which are situated behind it.
- o.* The internal oblique muscle; its lower edge, which arises from Poupart's ligament, is raised and turned to shew the parts behind it. It is inserted into the pubes behind the upper column of tendon which forms the abdominal ring.

- p.* The transversalis muscle. Its lower edge also arises from Poupart's ligament, but is here raised and turned up. It in its natural state runs over the cord to be inserted into the pubes behind the abdominal ring, which it serves as a valve to close posteriorly.
- q.* A fascia, connected with Poupart's ligament, which runs upwards to the transversalis, and unites itself to the posterior part of the transverse muscle and its tendon, and thus prevents the bowels from slipping between the lower edge of the muscle and Poupart's ligament, or between the fibres of the muscle itself.
- That portion of the fascia which is placed between the spinous process of the ilium at *b*, and the hole *r*, is strong; but that between the hole *r*, and the pubes, is often little more than condensed cellular membrane, as that part is strengthened by the tendon of the transversalis, and by the epigastric artery.
- A portion of the fascia is fixed in the pubes, and another part of it passes behind Poupart's ligament to unite with the femoral vessels.
- r.* The place at which the spermatic cord goes into the abdomen. The fascia situated on its outer side and lower part, is of considerable density, but becoming thin upon its inner side, so as to shew the epigastric artery and vein behind it; from the edge of the fascia a thin layer is sent off which unites itself to the spermatic cord, which fascia in this dissection has been removed.
- s.* The epigastric artery and vein, situated behind the fascia transversalis, at first on the inner side, and afterwards behind the spermatic cord. The epigastric artery is shewn here by cutting the fascia transversalis parallel to it.
- t t.* The spermatic cord, nearly two inches of which are above and to the outer side of the abdominal ring, and still not in the abdomen; it is also seen below the ring, running to the testicle.

PLATE II.

FIG. 1. Represents an oblique inguinal hernia in the inguinal canal.

The natural obliquity of the canal is partly lost in consequence of the pressure made by the hernia. The narrowing of the neck of the tumour at the internal ring is also shewn, and the extent to which the operator is frequently obliged to introduce the knife before he can release the strangulated bowel from the inner ring.

- a. Tendon forming the external ring reflected; a bougie passed under it.
- b. Contraction of the neck of the hernia at the internal ring, caused by the tendon of the transversalis on the inner side, and the margin of the fascia transversalis on the outer side. To this disposition of the tendinous structure is to be attributed the frequent occurrence of stricture at the internal abdominal ring.
- c. The hernia between the abdominal rings about two inches and a quarter in extent. The form of the tumour is shewn, the contraction at the inner ring, its sudden dilatation at the inguinal canal, and its narrowing at the external ring.
- d. Internal oblique and transversalis muscles reflected upwards from the hernial tumour; a bougie passed under them.
- e. Hernia in the scrotum, covered by the cremaster muscle.
- f. Testicle below the hernial sac.
- g. Femoral artery.

FIG. 2. Drawing of a congenital hernia that occurred under the late Mr. Chandler. The intestine is seen strangulated within the tunica vaginalis by a membranous band.

- a. Testicle.
- b. A band of membrane, adhering to the sides of the tunica vaginalis, through an aperture in which the intestine has protruded, and become strangulated.
- c. Intestine discoloured by the effects of strangulation.
- d. The portion of intestine below the internal ring and the strangulating band, free from pressure and retaining its natural appearance.
- e. Tendon of external oblique muscle slit up.

FIG. 3 and 4. Represents the appearance which an artificial anus exhibits under different states of the intestine.

In Fig. 3, the intestine is seen in a prolapsed state. In this boy whom I saw from Cambridge, the intestine usually prolapsed under active peristaltic action, and the opening in the integument became very much distended.

In Fig. 4 is seen the condition of the same parts when the prolapsed gut had been returned.

FIG. 5. Shews the coverings of femoral hernia.

- a. The fascia superficialis reflected, to expose the tendon of the external oblique and the hernial tumour.
- b. Tendon of the external oblique muscle.
- c. The process of fascia which connects Poupart's ligament with the fascia superficialis. It is this process which more immediately covers a femoral hernia.
- d. Fascia propria, a covering derived from the sheath of the femoral vessels, reflected.
- e. Hernial sac cut open, to shew its contents.
- f. Omentum.
- g. An absorbent gland.
- h. Saphæna major vein.

FIG. 6. Shews the appearance which the omentum and intestine assume, when gangrene has commenced.—From the same subject as Fig. 5.

- a. A convolution of intestine exposed in a state of gangrene. The larger portion of the gut exhibits a dusky purple or port wine color, while the central spot is of an ashen or greenish tint, shewing the completion of sphacelus.
- b. Omentum in a gangrenous state. It has been reflected to expose the intestine, which in femoral herniæ is often concealed from view by the omentum. The dusky red color indicates the inflammation which has preceded the state of gangrene; and the blood in the vessels being coagulated renders them distinct, and imparts the dark tint peculiar to gangrenous omentum.

Fig. 2.



Fig. 3.

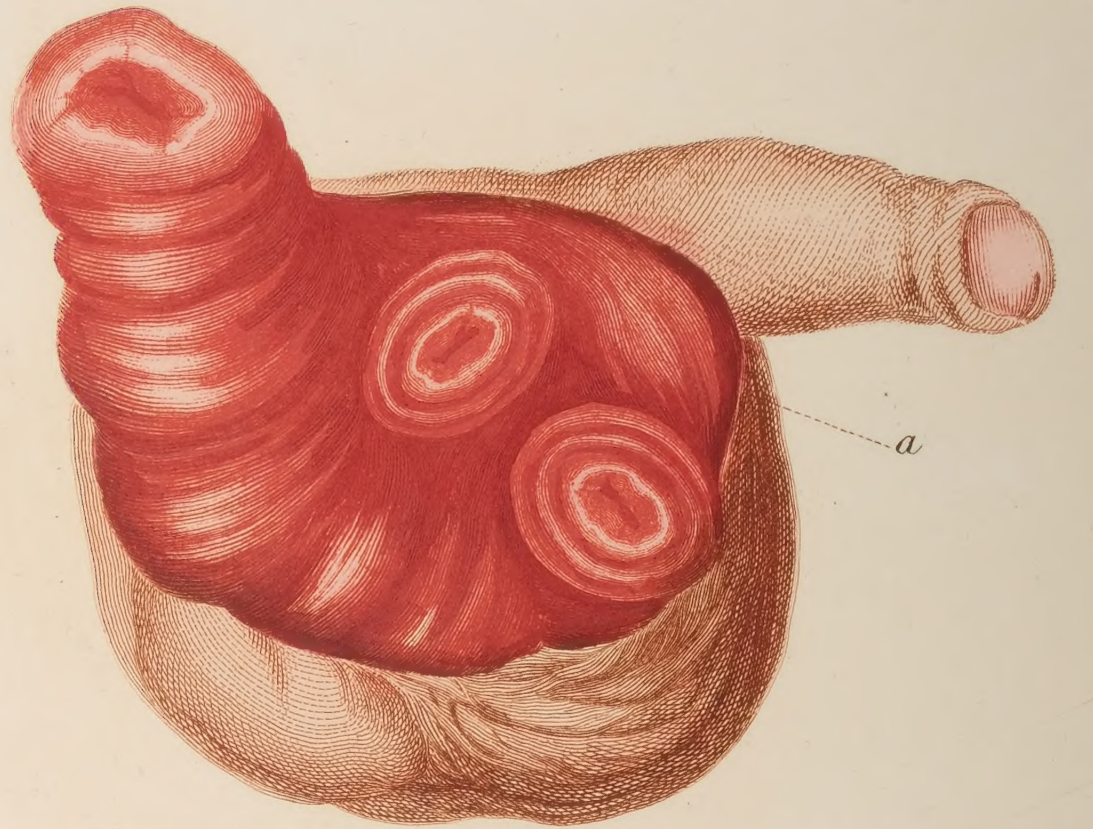


Fig. 1.



Fig. 4.

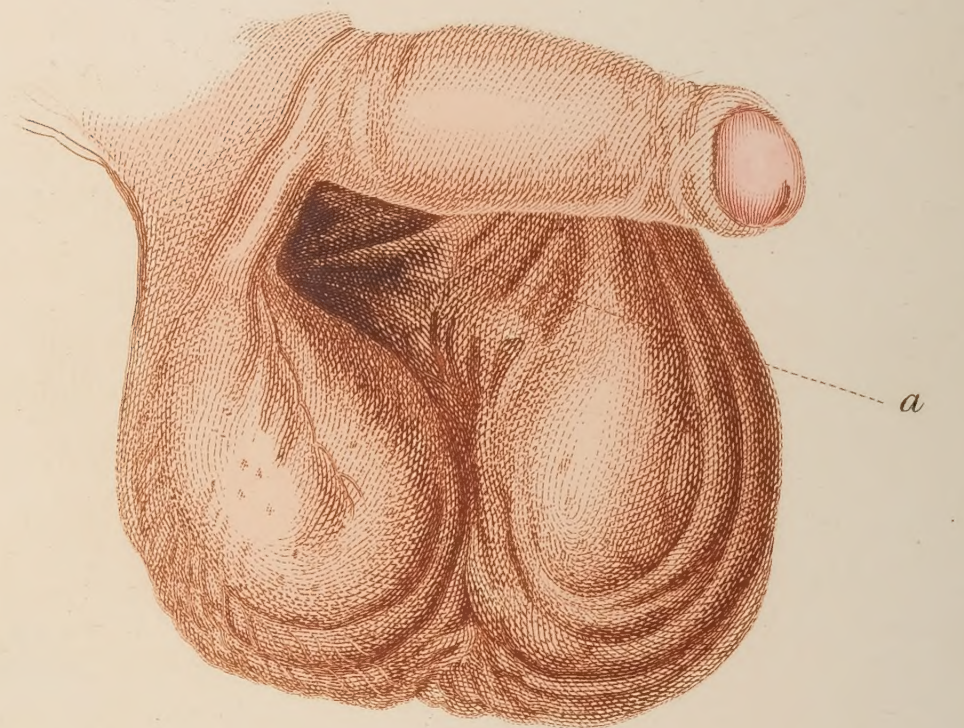


Fig. 5.



Fig. 6.





PLATE III.

REPRESENTS on the right side a small oblique inguinal hernia, making its appearance at the internal ring, on the outer side of the epigastric artery; and on the left side a scrotal hernia, with its coverings displayed by dissection.

- a a.* Fascia superficialis coming from the external abdominal ring, and forming the external investment of the hernia. At its upper part the transverse fibres of the external ring are seen.
- b b b.* Cremaster muscle thickened—seen descending under the margin of the external ring, and lost upon the tunica vaginalis at *d*.
- c.* Hernial sac.
- d.* Testicle.
- e.* Spine of ilium.
- f.* Tendon of the external oblique muscle reflected to shew the inguinal canal.
- g.* Abdominal ring.

- h h.* Poupart's ligament.
- i.* Internal oblique muscle.
- k.* Rectus.
- l.* Femoral artery.
- m.* Femoral vein.
- n.* Margin of the internal oblique muscle turned upward to expose the hernial sac, and epigastric artery on its inner side.
- o o.* Spermatic cord is seen emerging from the internal abdominal ring behind the hernia, and taking its course through the external ring into the scrotum.
- p.* An incipient hernia, appearing at the inner ring midway between the spine of the ilium and symphysis pubis.

PART 1.

PLATE IV.

Is an internal view of the preparation contained in the former plate. It exhibits the orifices of the two herniæ in the abdomen, and shews the change of place which the mouth of the sac undergoes as it enlarges, by approaching nearer than at its first descent to the symphysis pubis. The origin and course of the vessels connected with the disease are shewn.

- | | |
|--|---|
| <p><i>a.</i> Situation of the symphysis pubis.</p> <p><i>b.</i> Spinous process of the ilium.</p> <p><i>cc. cc.</i> Abdominal muscles drawn downwards.</p> <p><i>dd.</i> The thighs.</p> <p><i>ee.</i> The psoas muscle upon each side.</p> <p><i>f.</i> The spine.</p> <p><i>gg.</i> The kidneys.</p> <p><i>hh.</i> Aorta.</p> <p><i>ii.</i> Iliac arteries.</p> <p><i>kk.</i> Epigastric arteries, arising from the iliac arteries, and passing between the mouths of the hernial sacs and the symphysis pubis, but still near to the inner side of the mouth of each sac.</p> <p><i>ll.</i> Spermatic arteries, arising from the aorta, and passing out of the abdomen behind the hernial sacs.</p> | <p><i>mm.</i> Inferior cava.</p> <p><i>n.</i> Iliac vein.</p> <p><i>oo.</i> Epigastric veins accompanying the epigastric arteries.</p> <p><i>qq.</i> Spermatic veins, arising upon the right side from the inferior cava, on the left, from the emulgent vein.</p> <p><i>rr.</i> Emulgent veins which in part cover the emulgent arteries.</p> <p><i>ss.</i> Ureters.</p> <p><i>t.</i> Urinary bladder.</p> <p><i>vv.</i> Vasa deferentia passing to the posterior part of the bladder.</p> <p><i>x.</i> Incipient inguinal hernia; its mouth seen midway between the spine of the ilium and symphysis pubis.</p> <p><i>w.</i> Mouth of the large inguinal hernia extended towards the symphysis pubis, and occasioning an unnatural curve in the epigastric artery.</p> <p><i>yyy.</i> The peritoneum.</p> |
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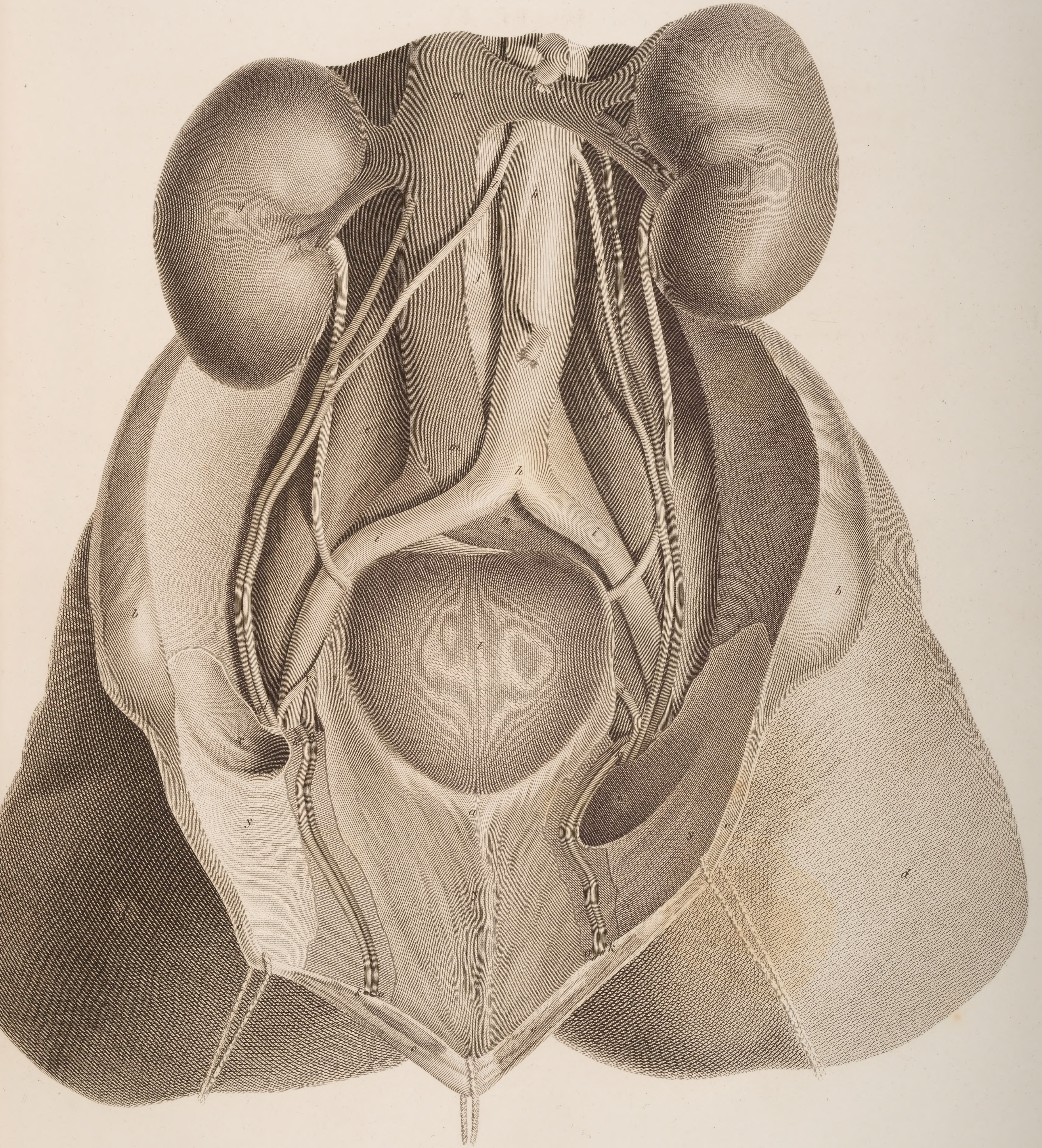


Fig. 1.



Fig. 2.



Fig. 4.

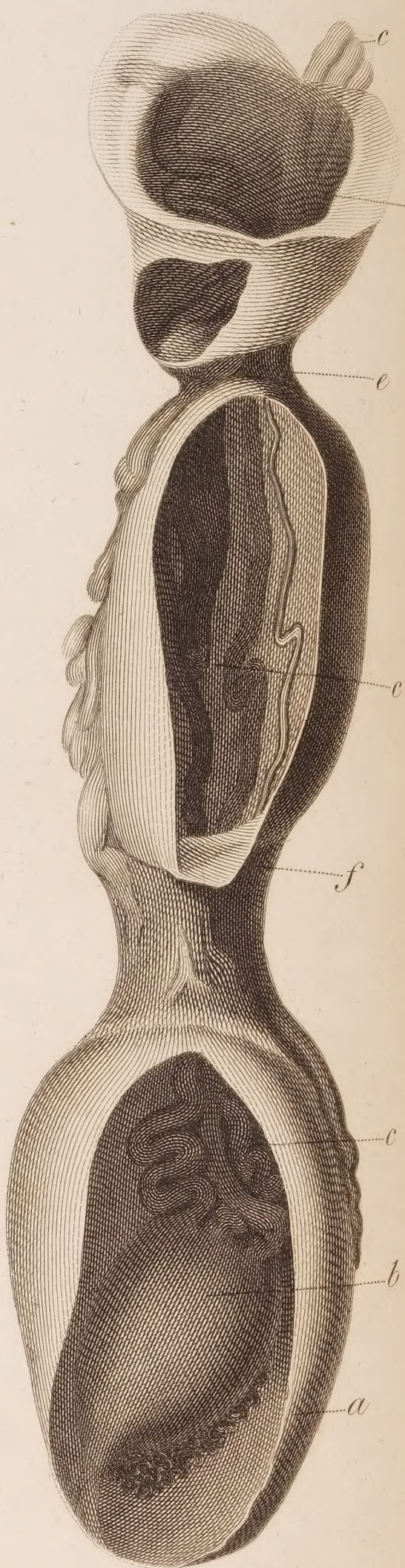


Fig. 3.

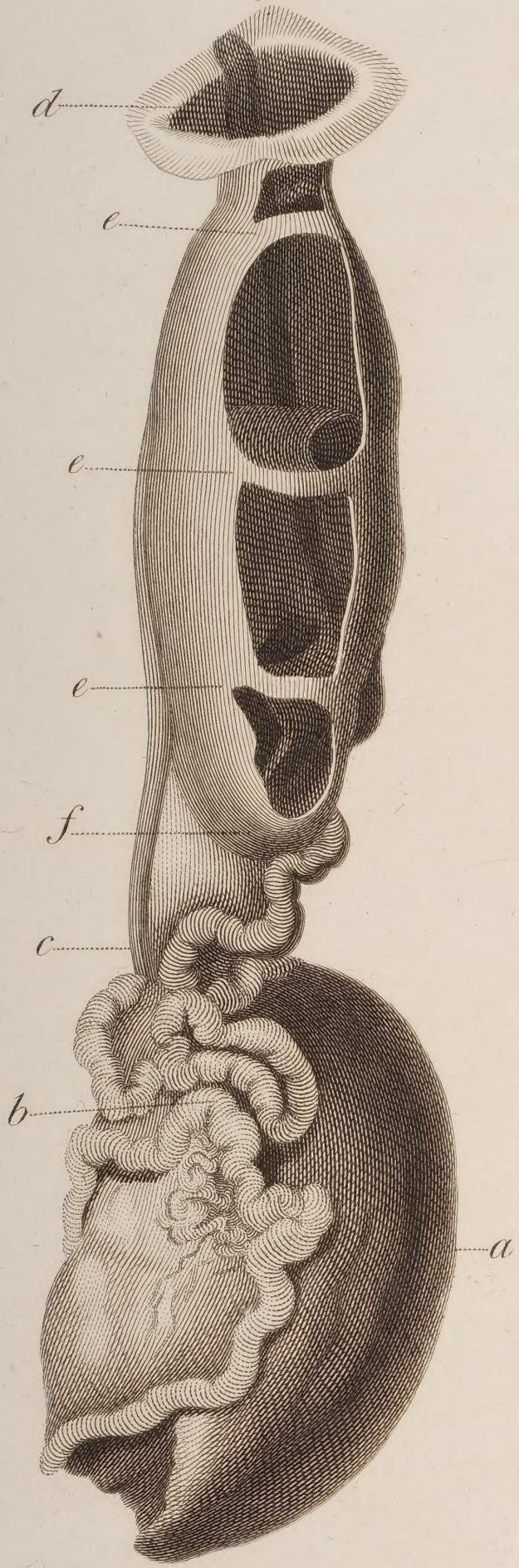


Fig. 8.



Fig. 5.

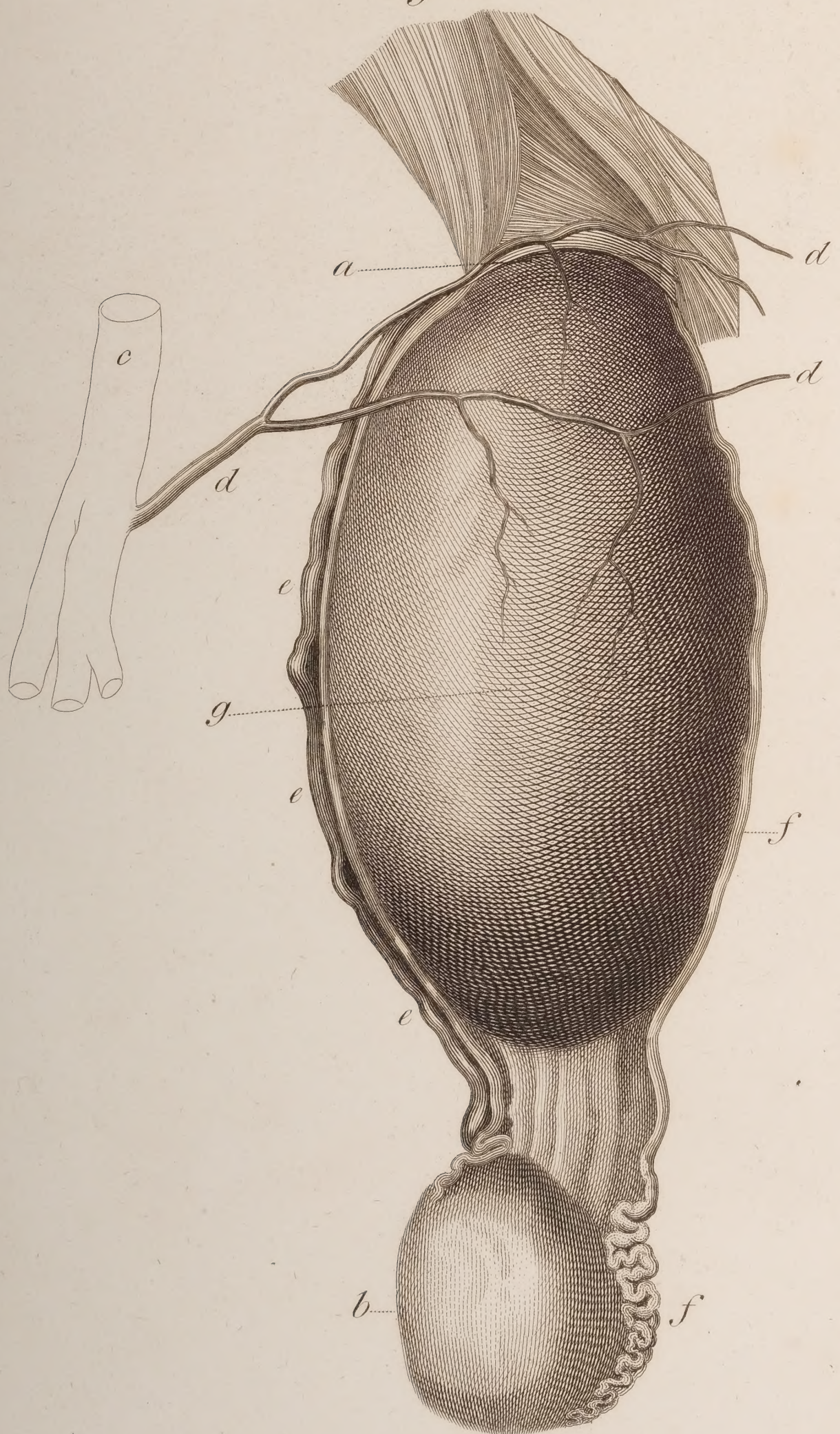


Fig. 6.



Fig. 7.

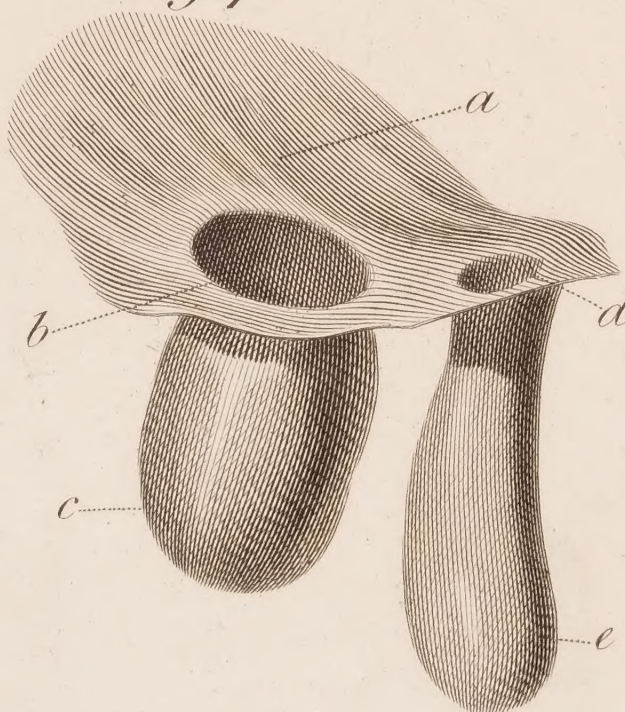


PLATE V.

FIG. 1. Shews a sac taken from the body of a person who laboured under an inguinal hernia.

- a.* Its mouth.
- b.* The course of the vas deferens behind it.

FIG. 2. This gives a view of a hernial sac, which has passed no further than the abdominal ring, so that the whole of this sac is included between the abdominal ring and the place at which the spermatic cord quits the abdomen.

- a.* Abdominal ring.
- b.* Poupart's ligament.
- c.* Iliac artery, *d* femoral artery.
- e e.* Epigastric artery passing behind the mouth of the sac.
- ff.* Spermatic cord passing behind the sac, and through the abdominal ring, to the testis.
- g.* The testis.
- h.* Mouth of the hernial sac.
- i.* The fundus of the sac which just reaches the abdominal ring.

FIG. 3. Shews the hernial sac divided by several septa.

- a.* The tunica vaginalis testis.
- b.* Spermatic vessels.
- c.* Vas deferens.
- d.* Mouth of the hernial sac.
- e e e.* Septa seen in the sac, with small apertures in them.
- f.* The fundus of the sac.

FIG. 4. Shews a hernial sac closed opposite to the abdominal ring, but open above the ring to the abdomen. I think that no inconvenience would arise from this, as the intestine could not descend into the scrotum, and strangulation would not probably take place above.

- a.* Tunica vaginalis.
- b.* Testis.
- c c.* Spermatic vessels.
- d.* Mouth of the sac.
- e.* The place at which the sac is closed, which is opposite to the situation of the abdominal ring.
- f.* The fundus of the sac.

FIG. 5. A hernial sac, in which the spermatic cord has been divided by it, so as to place the spermatic artery and vein on the inner side, and the vas deferens upon the outer side of the sac.

- a.* Abdominal ring.
- b.* Testis.
- c.* Femoral artery.
- d d d.* External pudendal artery.
- e.* Spermatic artery and vein.
- f.* Vas deferens.
- g.* Hernial sac.

FIG. 6. Hernial sac shut at the abdominal ring by adhesion, leaving a circumscribed bag, in which water was collected.

- a.* Sac shut at the ring, but it was open towards the abdomen above the ring.
- b.* The testis.
- c.* Spermatic cord.
- d.* Sac cut open.
- e.* Part at which the sac was closed by adhesion.

FIG. 7. Shews two sacs, one by the side of the other; the one contracted by wearing a truss so as to be no longer capable of receiving the viscera; the other larger, and forming by the side of the first.

- a.* The peritoneum.
- b.* Mouth of a newly formed sac.
- c.* Its fundus.
- d.* Contracted mouth of an old hernia.
- e.* Its fundus.

FIG. 8. An omental and intestinal hernia irreducible from adhesion; and membranous bands extending across the hernial sac.

- a.* Abdominal ring.
- b b.* Columns of tendons forming the ring. *c.* Transverse tendinous fibres passing to the two columns.
- d.* Tunica vaginalis.
- e.* Epididymis.
- f.* Testis.
- g g.* Fascia coming from the abdominal ring to cover the sac.
- h h.* Hernial sac.
- i i.* Membranous bands crossing the sac.
- k.* A piece of whalebone to keep the sac extended.
- m.* Intestine adhering to the sac.
- n n.* Omentum also adhering to the sac.

PLATE VI.

SHEWS trusses of different constructions for the support of inguinal and femoral herniæ.

FIG. 1. Salmon and Ody's self-adjusting truss. The right pad moves by means of a ball and socket, and is applied to the hernia; the left pad is of a more rounded form, and is intended for the sacrum. They are connected by a strong steel spring.

FIG. 2. Is an anterior view of the same truss applied to a left inguinal hernia. The spring embraces the opposite side to that on which the hernia is seated, and crosses over the pubes to fix the pad upon the rupture; it is hence called the opposite sided truss.

FIG. 3. Posterior view of the same truss; the mode of applying the pad to the lower part of the spine is shewn. In this truss no circular or thigh strap are required.

FIG. 4. Salmon and Ody's truss divested of its covering to shew its ball and socket apparatus, and the contrivance by which the spring can be lengthened or shortened at pleasure.

FIG. 5. Represents the two apertures through which an oblique hernia descends, and the situation of the epigastric artery; below Poupart's ligament on the left side is pointed out the part on which a truss should be applied for a femoral hernia.

FIG. 6. Oblique hernia passing through the inguinal canal upon the right side, and appearing through the external ring as a scrotal rupture. On the left side is seen a direct hernia which passes on the inner or pubic side of the epigastric artery, and protrudes only at the external ring. The oblique course of that on the right side, shews the necessity of wearing a truss that makes pressure on the inguinal canal, especially in the incipient state of a hernia.

FIG. 7. Represents Salmon and Ody's truss applied to a femoral hernia on the right side. The outline on the left side represents the part to which the pad of the truss should be applied.

This truss is well adapted for hernia, in persons who are not under the necessity of earning their bread by the sweat of their brow; and I therefore recommend it to the opulent and the higher orders of society. But when hernia requires strong pressure under great bodily exertion, I prefer a truss which is less liable to vary its situation. There is this objection to Salmon's truss, that it cannot be worn during the night so as to make pressure on the rupture; and the cure of the disease demands a constant, equal, and regular pressure.

FIG. 8. Common inguinal hernia truss. Its spring encircles half the body, the circle being completed by a strap which is fastened to one of the studs on the long pad. This truss is well calculated for the working classes; and may be rendered still more secure by a thigh strap to prevent the pad rising, as is seen in fig. 10.

FIG. 9. Double truss of the same construction.

FIG. 10. Represents a bandage or truss without a spring, except a small plate to render the pad secure. It consists of a pad with three studs, a strap encircling the pelvis, and a strap passing from the lower stud of the pad between the thighs to be attached behind to the circular strap. Either of these straps may be made with a spring if required.

FIG. 11. Represents a posterior view of the common truss, fig. 8., as worn for an inguinal hernia.

FIG. 12. Anterior view of the same truss, applied to an inguinal rupture.

When required for femoral hernia the common truss is made with a somewhat larger pad, and the extremity curved downwards so as to reach below Poupart's ligament.

FIG. 13. Anterior view of the common truss, applied to a double inguinal hernia.

Egg's truss differs from the common truss in having a nearly circular spring, and is well calculated to keep up large ruptures which are capable of bearing strong pressure.

A bandage has been recently invented by Coles, which is well adapted to support scrotal rupture. It consists of a circular bandage or strap, with a pad acting by means of a spiral spring; the lower part of the pad is lengthened downwards so as to pass between the thigh and the scrotum, and thus make pressure upon the whole length of the sac; a strap is continued from the lower part of the pad to the back part of the circular bandage. He has also constructed a truss resembling in some respects the common truss; but the pad instead of being fixed works with a spiral spring, which allows it to yield in the various motions of the body, and at the same time to make more uniform pressure than the ball and socket pad can effect.—ED.

PLATE VI.

Fig. 1.

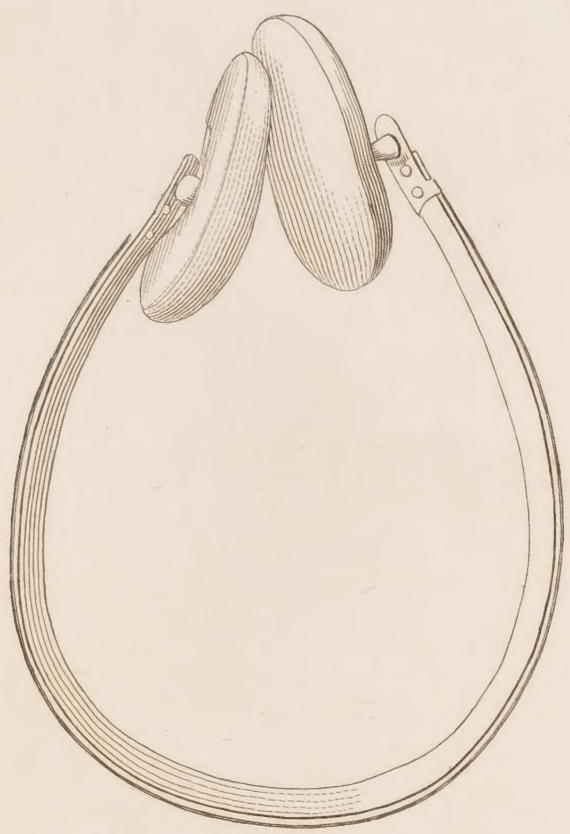


Fig. 2.

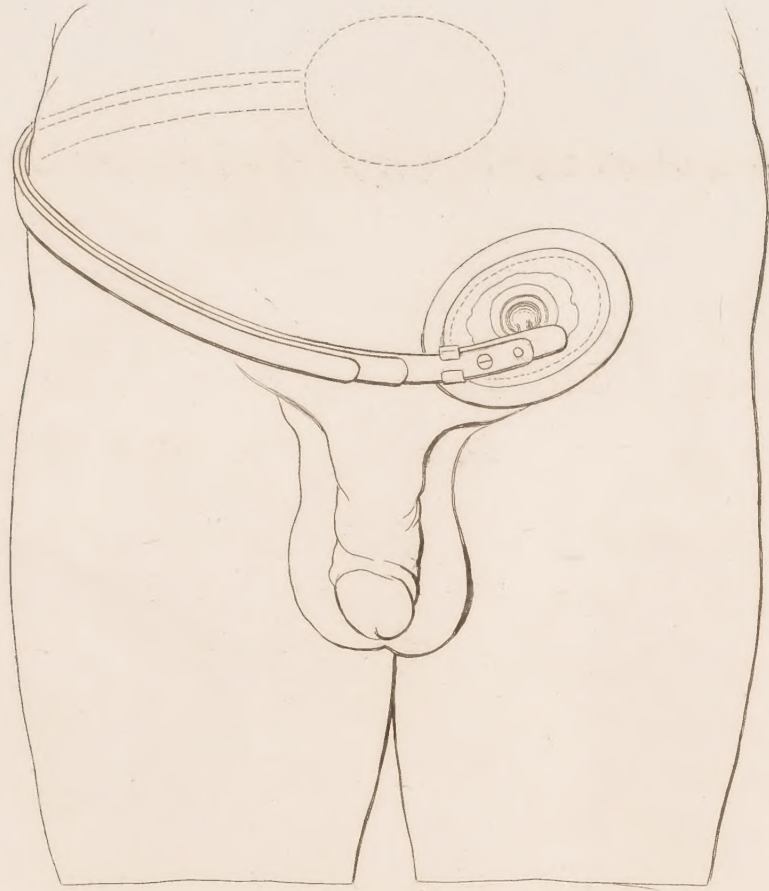


Fig. 3.

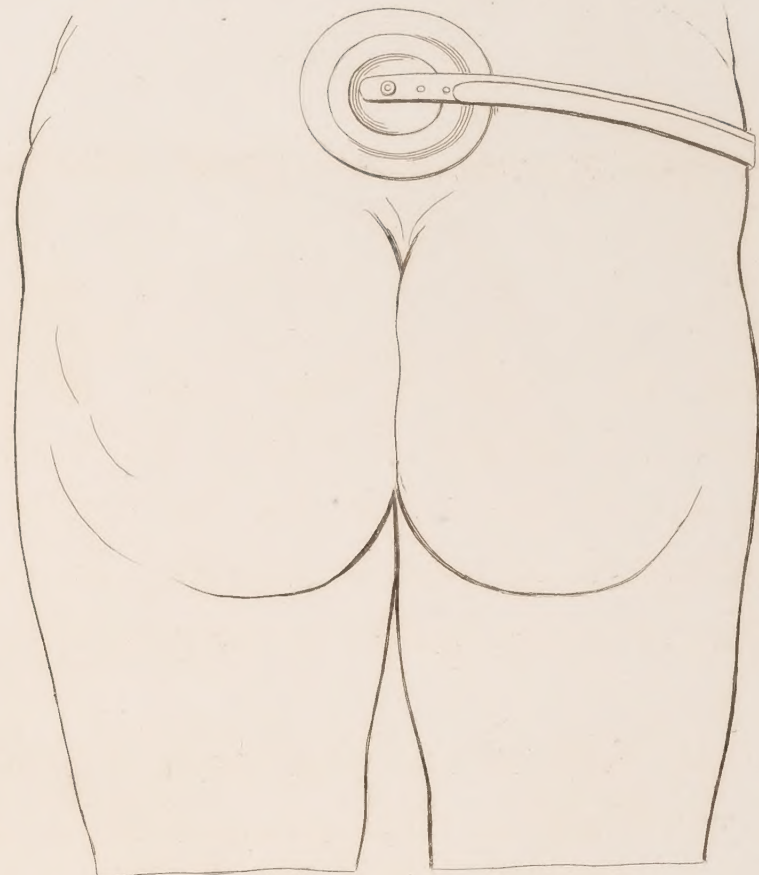


Fig. 4.



Fig. 5.

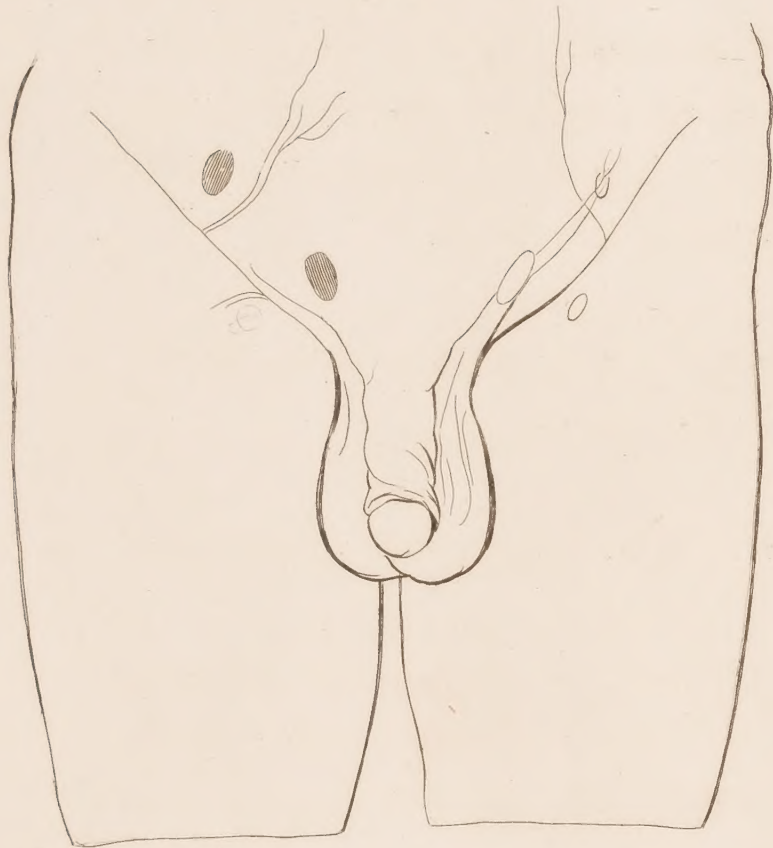


Fig. 6.



Fig. 7.

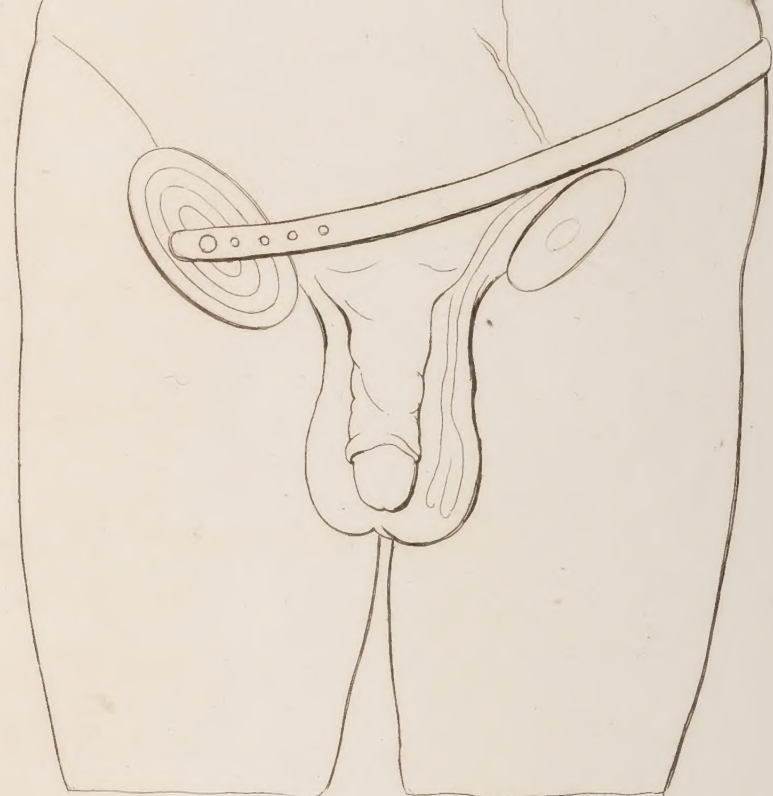


Fig. 8.

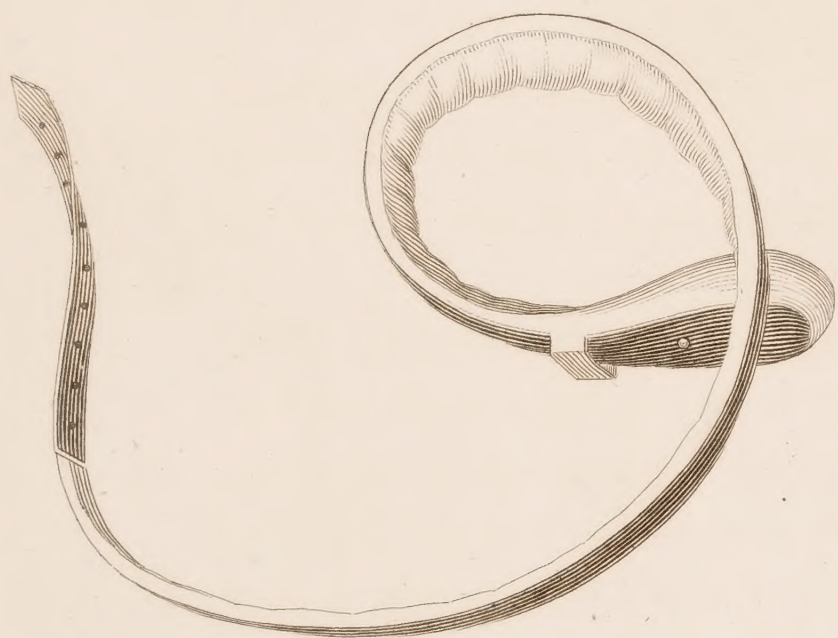


Fig. 10.

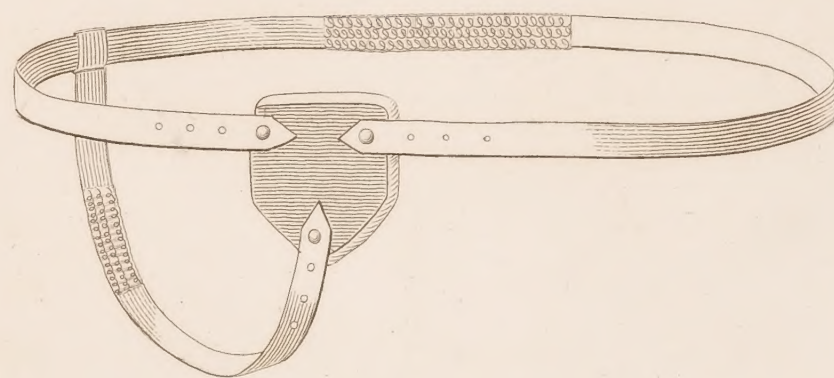


Fig. 9.

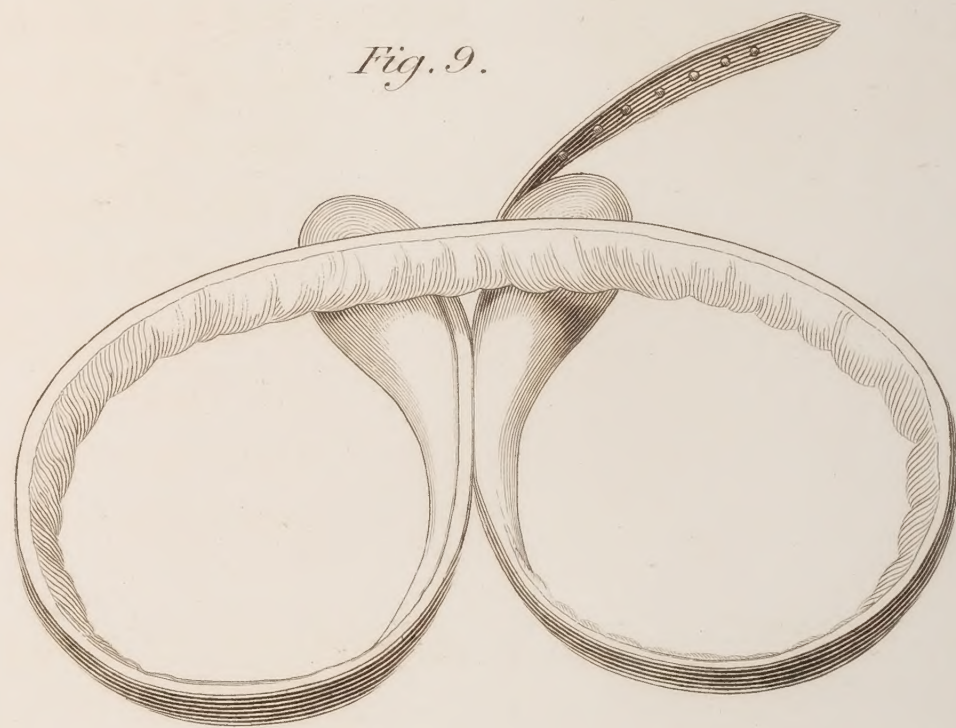


Fig. 11.

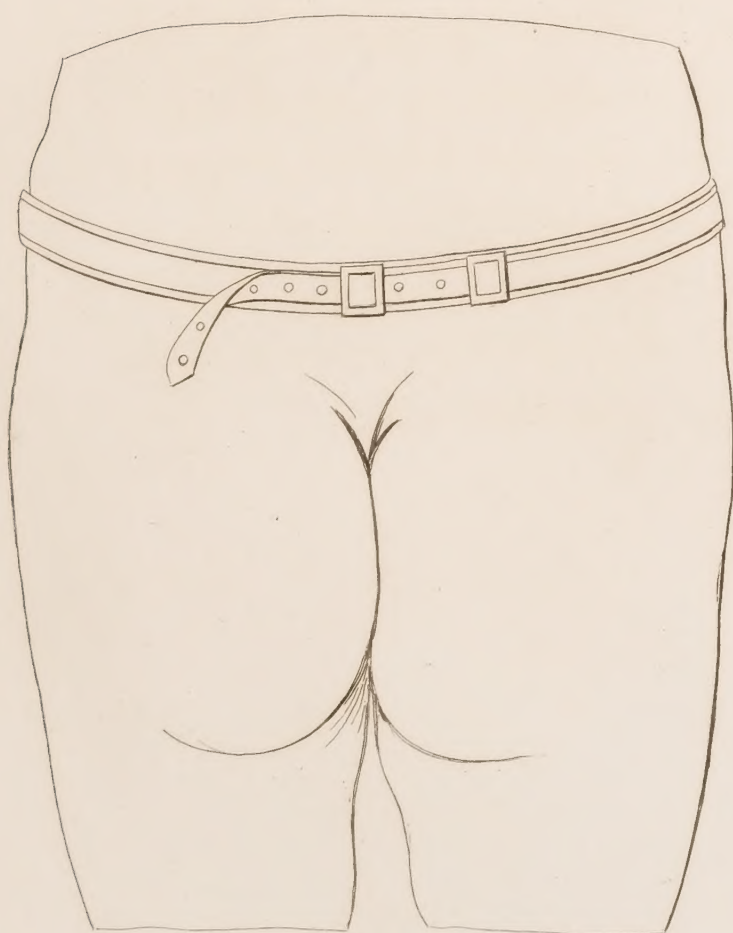


Fig. 13.

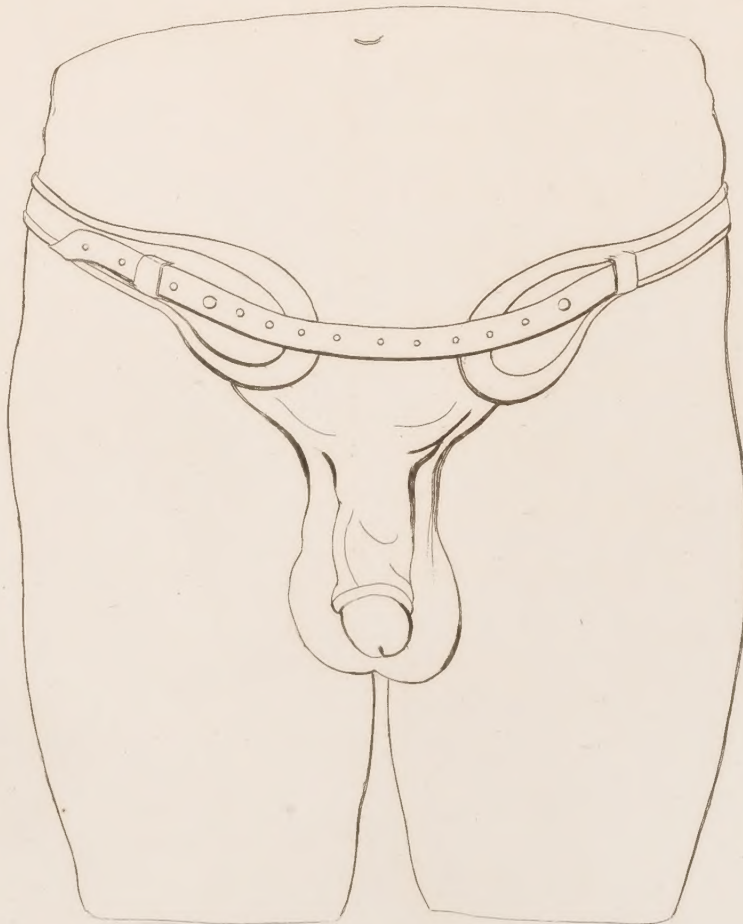
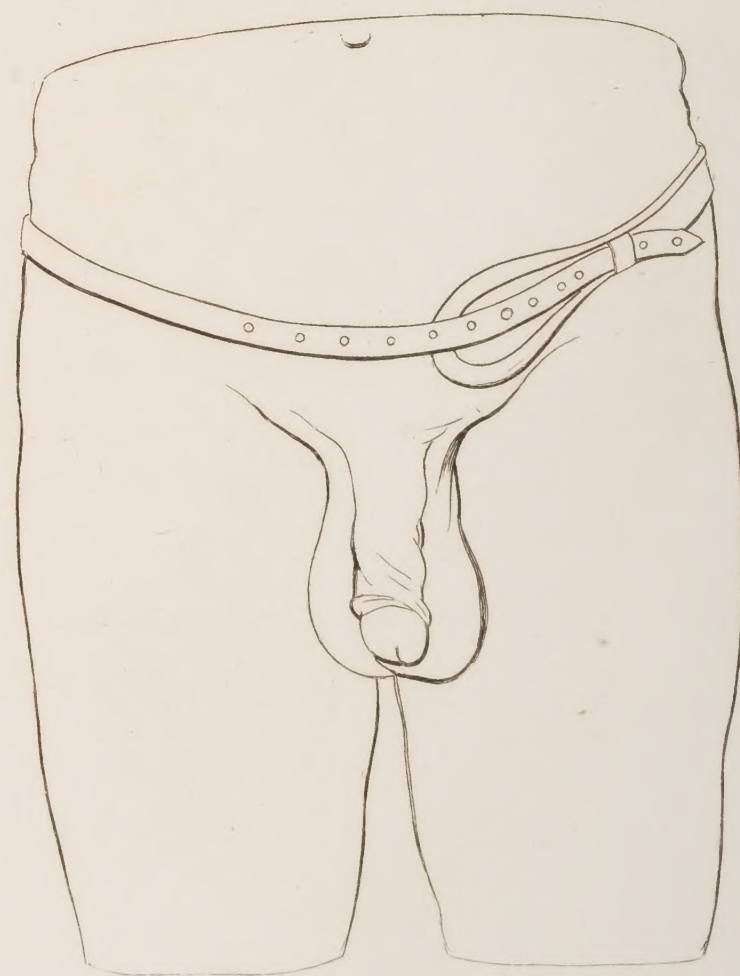


Fig. 12.



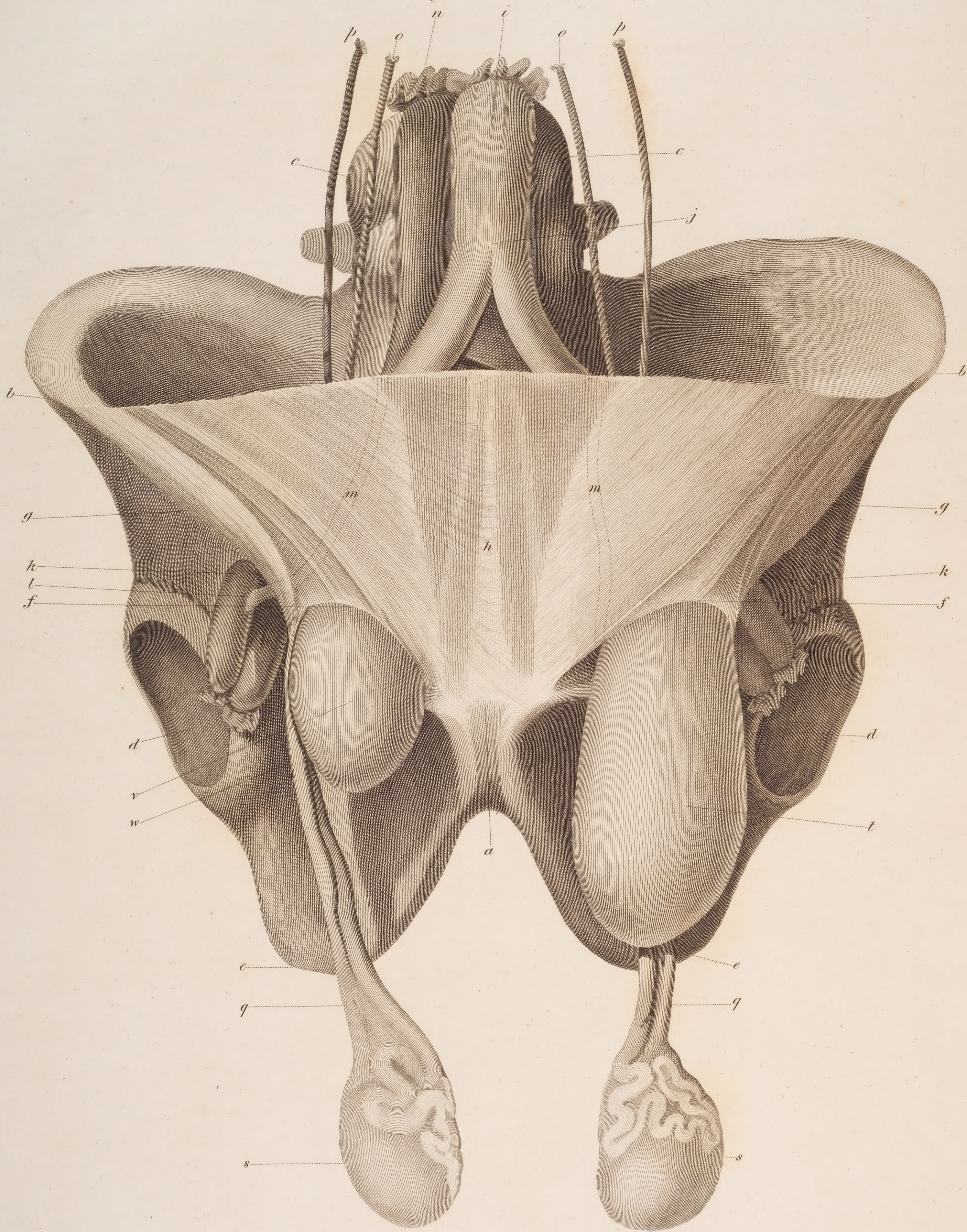


PLATE VII.

IN this Plate a common inguinal hernia is shewn upon the left side, taking its course through the abdominal ring on the outer side of the epigastric artery, between that artery and the spine of the ilium. The hernia upon the right side is that variety of the inguinal hernia which passes from the abdomen on the inner side of the epigastric artery, or between that artery and the symphysis pubis.

- | | |
|--|---|
| <p><i>a.</i> Symphysis pubis.</p> <p><i>b.</i> Anterior superior spinous process of the ilium.</p> <p><i>c c.</i> The spine.</p> <p><i>d d.</i> The acetabula.</p> <p><i>e e.</i> Tuberosities of the ischia.</p> <p><i>f f.</i> Abdominal rings.</p> <p><i>g g.</i> Poupart's ligaments.</p> <p><i>h.</i> Linea alba.</p> <p><i>i.</i> Aorta.</p> <p><i>j.</i> Bifurcation of the aorta.</p> <p><i>k k.</i> Iliac and femoral arteries.</p> <p><i>l.</i> Origin of the epigastric artery on the right side.</p> <p><i>m m.</i> Course of the epigastric artery on each side, marked by dotted lines; the left side passing on the inner, the right, on the outer side of the hernial sac.</p> | <p><i>n.</i> Vena cava inferior.</p> <p><i>o o.</i> Spermatic arteries.</p> <p><i>p p.</i> Spermatic veins.</p> <p><i>q q.</i> Spermatic cords.</p> <p><i>s s.</i> Testes.</p> <p><i>t.</i> Oblique hernial sac upon the left side, situated on the outer side of the epigastric artery.</p> <p><i>v.</i> Direct hernial sac upon the right side, placed upon the inner side of the epigastric artery.</p> <p><i>w.</i> The spermatic cord passing on the outer side of the direct hernial sac, whilst it is seen on the posterior part of that on the opposite side.</p> |
|--|---|

PLATE VIII.

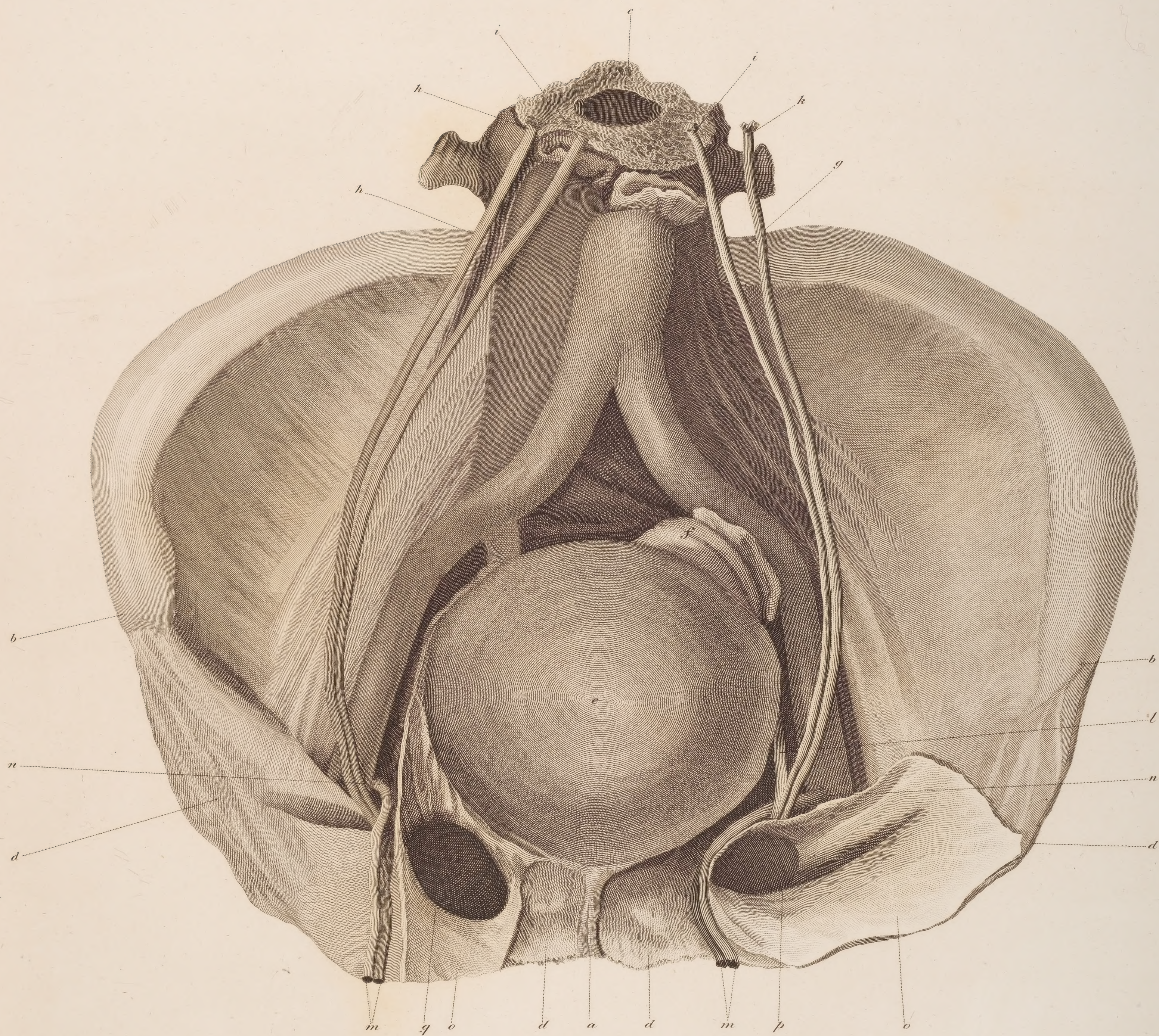
AN internal view of the same preparation as that of the former Plate, shewing the orifice of the hernial sacs, with the relative situations of the epigastric and spermatic vessels.

- a.* Symphysis pubis.
- b.* Anterior superior spinous process of the ilium.
- c.* The spine.
- ddd.* Abdominal muscles drawn downwards to shew the cavity of the pelvis.
- e.* The bladder.
- f.* The rectum.
- g.* Bifurcation of the aorta.
- h.* The inferior cava.
- i i.* Spermatic arteries.
- k k.* Spermatic veins.

- l.* Vas deferens.
- m m.* Epigastric arteries and veins.
- n n.* Origin of epigastric artery on each side.
- o o.* Peritonæum.
- p.* Mouth of the hernial sac upon the left side, taking the usual oblique course of inguinal hernia.
- q.* Mouth of the hernial sac on the right side, situated upon the inner side of the epigastric artery.

By this Plate it will be at once seen, that the division of the stricture upwards, and opposite the middle of the orifice of the sac, will be in both species of hernia perfectly safe.





Kirkland, del^t

Heath, sculp^t

London, Published, Oct: 1st 1845, by E. Cox & Son, St. Thomas's Street, Borough.



PLATE IX.

ON the right side is seen an oblique inguinal hernial sac upon the anterior part of the spermatic cord. On the outer side of this hernia appears an artificial anus, formed from a second protrusion of intestine on the side of the former: at this opening the ileum had prolapsed, but in making the preparation it was returned into the abdomen. Both these herniæ had passed through the abdominal ring, and were situated on the outer side of the epigastric artery, which has an unusual curve, produced by the long-continued pressure of the hernia. On the left side a hernial sac is seen, which has passed down on the inner side of the epigastric artery and spermatic cord.

- | | |
|---|--|
| <p><i>a.</i> Symphysis pubis.</p> <p><i>b.</i> Anterior superior spinous process of the ilium.</p> <p><i>c c.</i> Abdominal ring.</p> <p><i>d d.</i> Abdominal muscles.</p> <p><i>e e.</i> Poupart's ligaments.</p> <p><i>f f.</i> Femoral arteries.</p> <p><i>g g.</i> Course of the epigastric artery upon the right side.</p> <p><i>h h.</i> Origin and course of the epigastric artery on the left side.</p> <p><i>i i.</i> Spermatic cord on the right side.</p> <p><i>j j.</i> Testes.</p> <p><i>k k.</i> Vasa deferentia.</p> <p><i>l.</i> Spermatic vessels on the left side in a varicose state.</p> | <p><i>m.</i> Spermatic and epigastric arteries crossing upon the outer side of the left hernial sac.</p> <p><i>n.</i> The artificial anus, by which for eleven years the fæces were discharged.</p> <p><i>o.</i> The sac of the inguinal hernia, which was the first which had descended in this man.</p> <p><i>p.</i> Hernial sac on the inner side of the epigastric and spermatic vessels, which will be found to have an inclination inwards and upwards towards the pubes, and not as in the common inguinal hernia, towards the ilium.</p> <p><i>q.</i> The colon.</p> |
|---|--|

PLATE X.

THIS Plate shews six hernial sacs, which were taken from a patient of Mr. Weston's, surgeon, Shoreditch, who laboured under a difficulty of discharging his urine, from a stricture and stone in his urethra. Two of the sacs upon each side were placed between the umbilical and epigastric arteries; and one on each side is situated between the remains of the umbilical arteries and the pubes. They passed between the tendinous fibres of the transversalis, which they had separated, and entered the abdominal rings, after which they were covered, as usual, by the fascia, which is extended from the external oblique muscle over the spermatic cords.

- | | |
|--|--|
| <p><i>a.</i> Situation of the symphysis pubis.</p> <p><i>b.</i> The muscle removed from the anterior superior spinous process of the ilium.</p> <p><i>c.</i> Abdominal muscles lined with peritoneum.</p> <p><i>d d.</i> Spermatic cords.</p> <p><i>e e.</i> Testes.</p> <p><i>f f.</i> Remains of the umbilical arteries.</p> <p><i>g g.</i> Epigastric arteries and veins.</p> | <p><i>h i.</i> Two hernial sacs on the left side, formed between the epigastric and umbilical arteries.</p> <p><i>j.</i> Hernial sac formed between the umbilical artery and symphysis pubis.</p> <p><i>k l.</i> Two hernial sacs formed between the epigastric and umbilical arteries on the right side.</p> <p><i>m.</i> Hernial sac between the umbilical artery and the pubes on the right side.</p> |
|--|--|





Kirland del.

London, Published Oct. 12th 1816 by E. Cox & Son, St. Thomas's Street, Borough.

Parks sculpt.

Fig. 1.

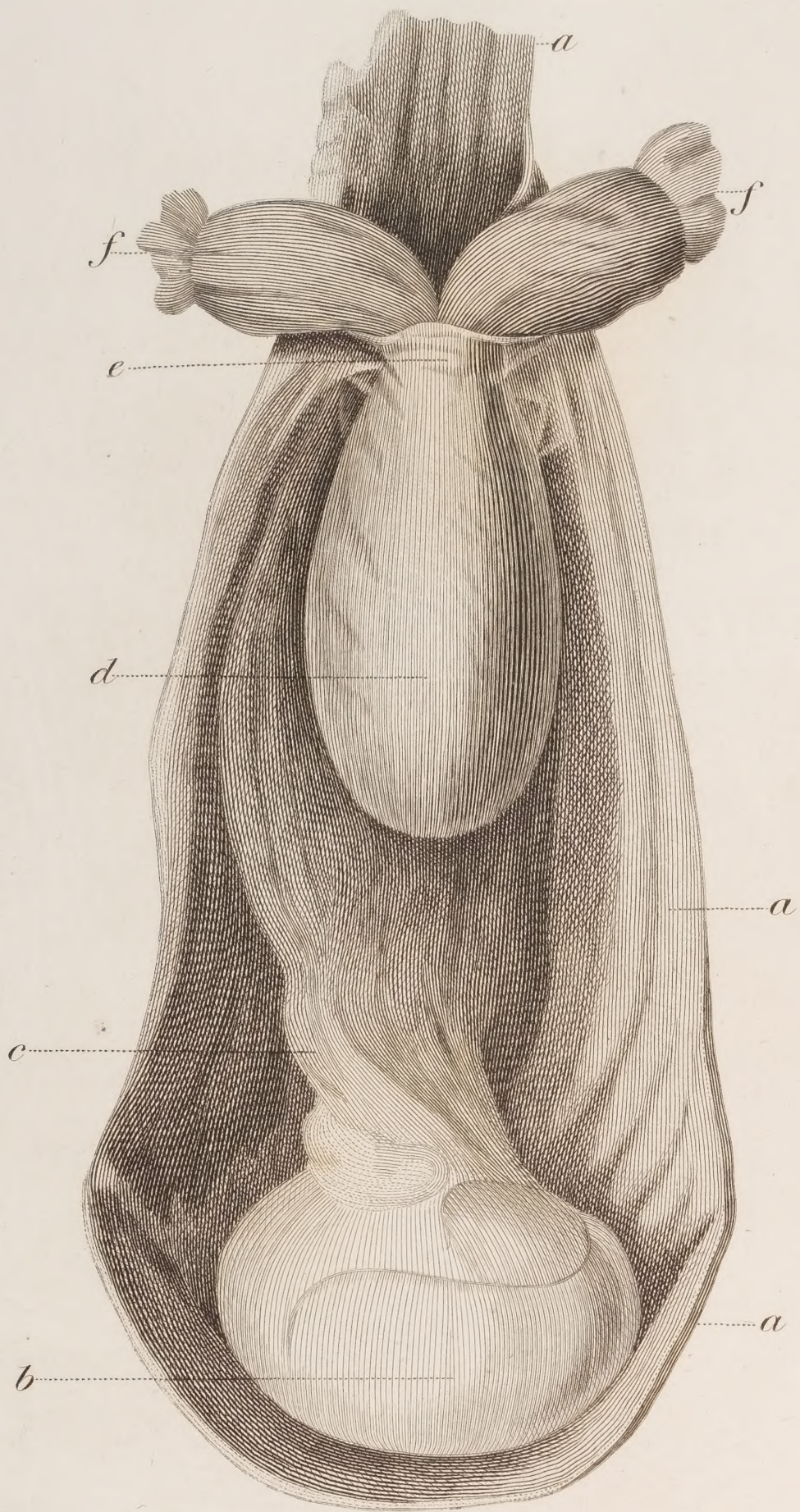


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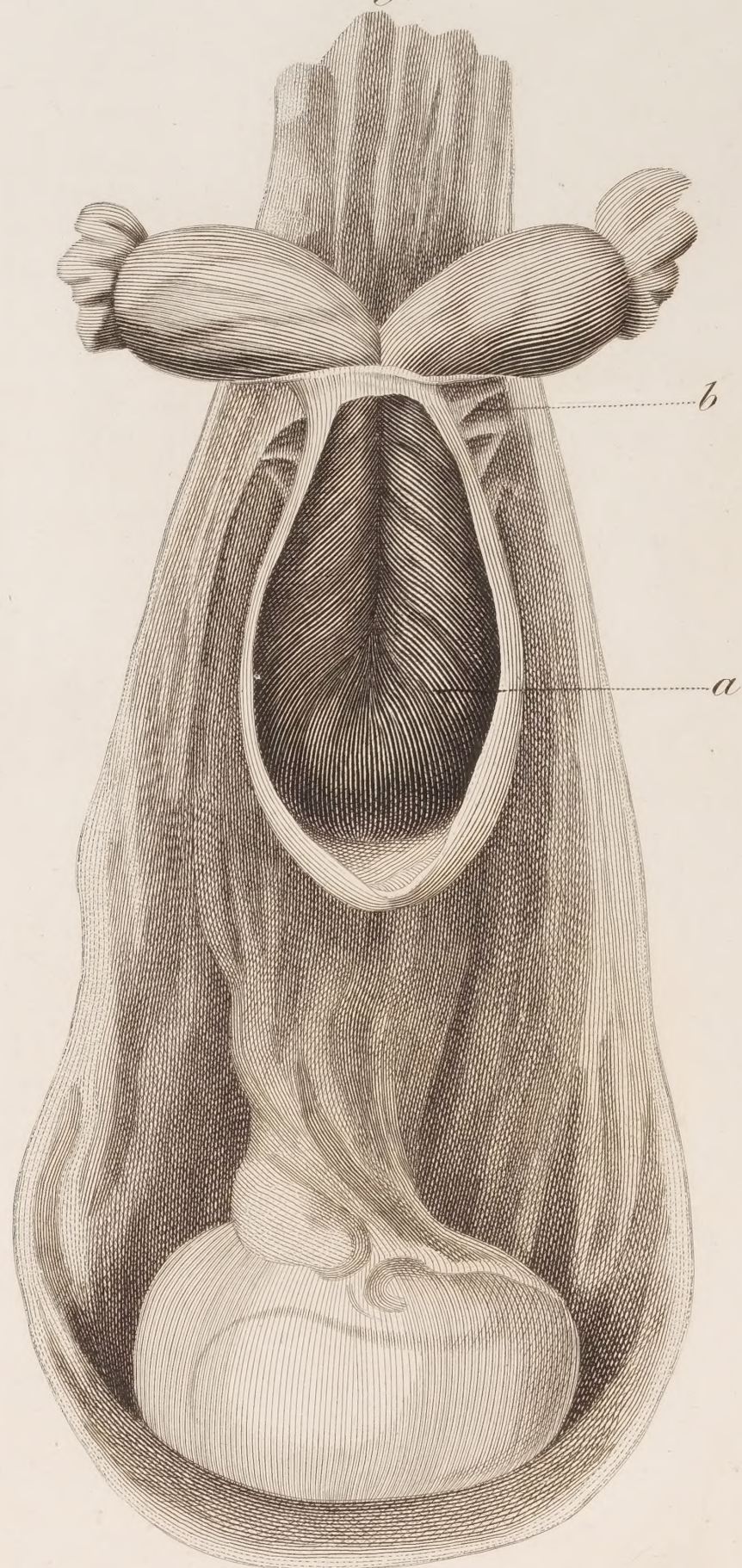


Fig. 3.

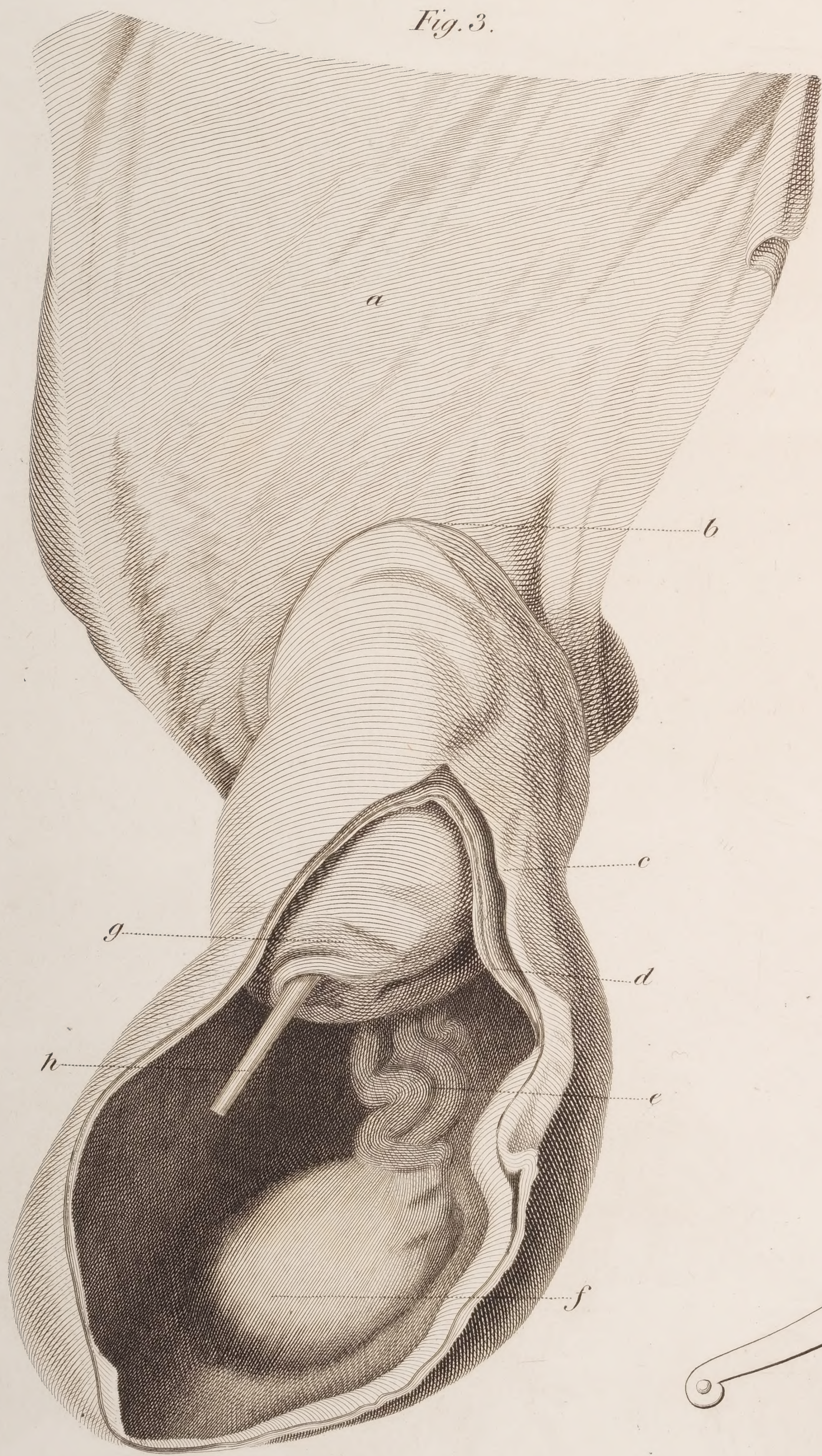


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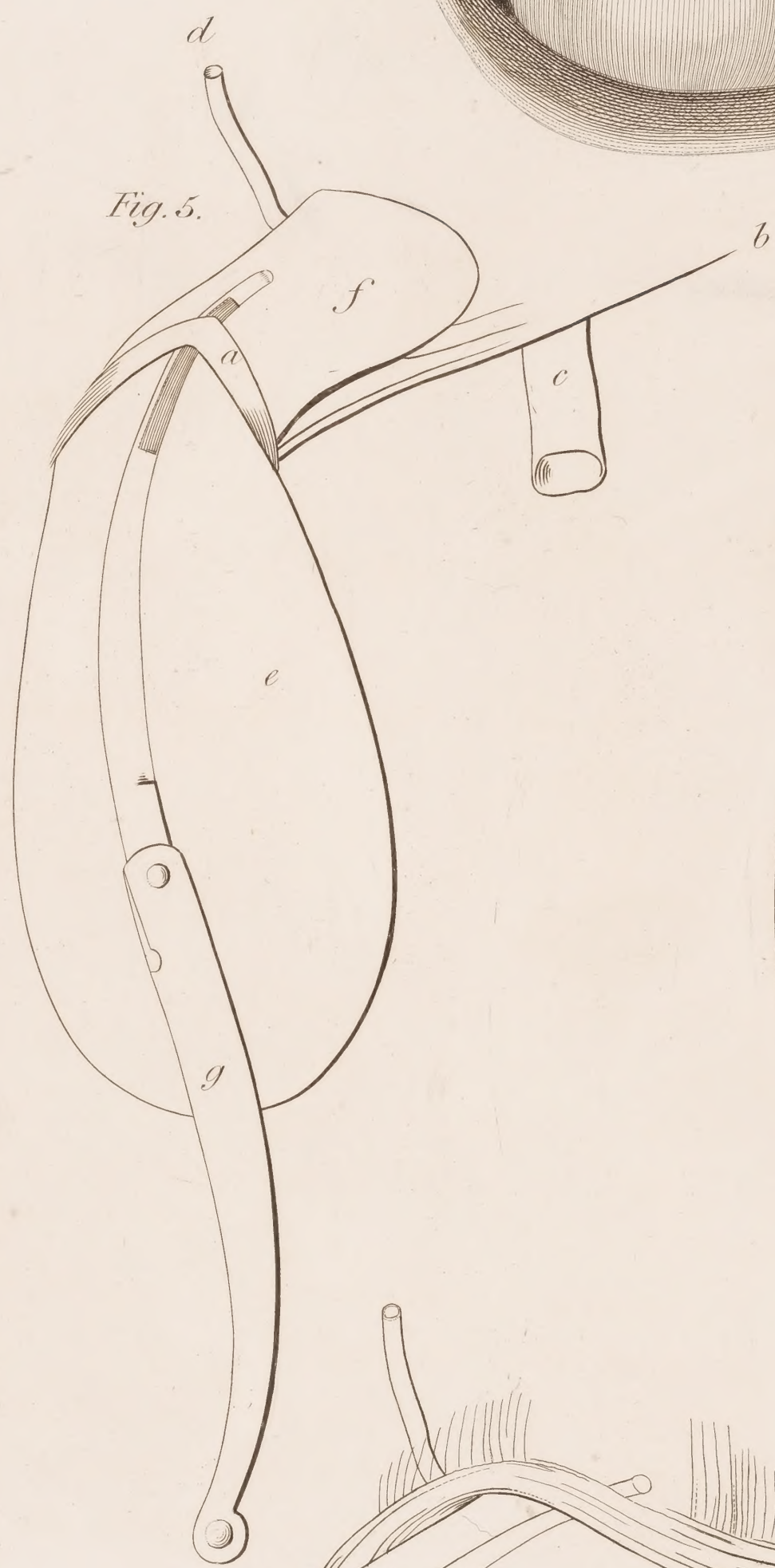


Fig. 6.

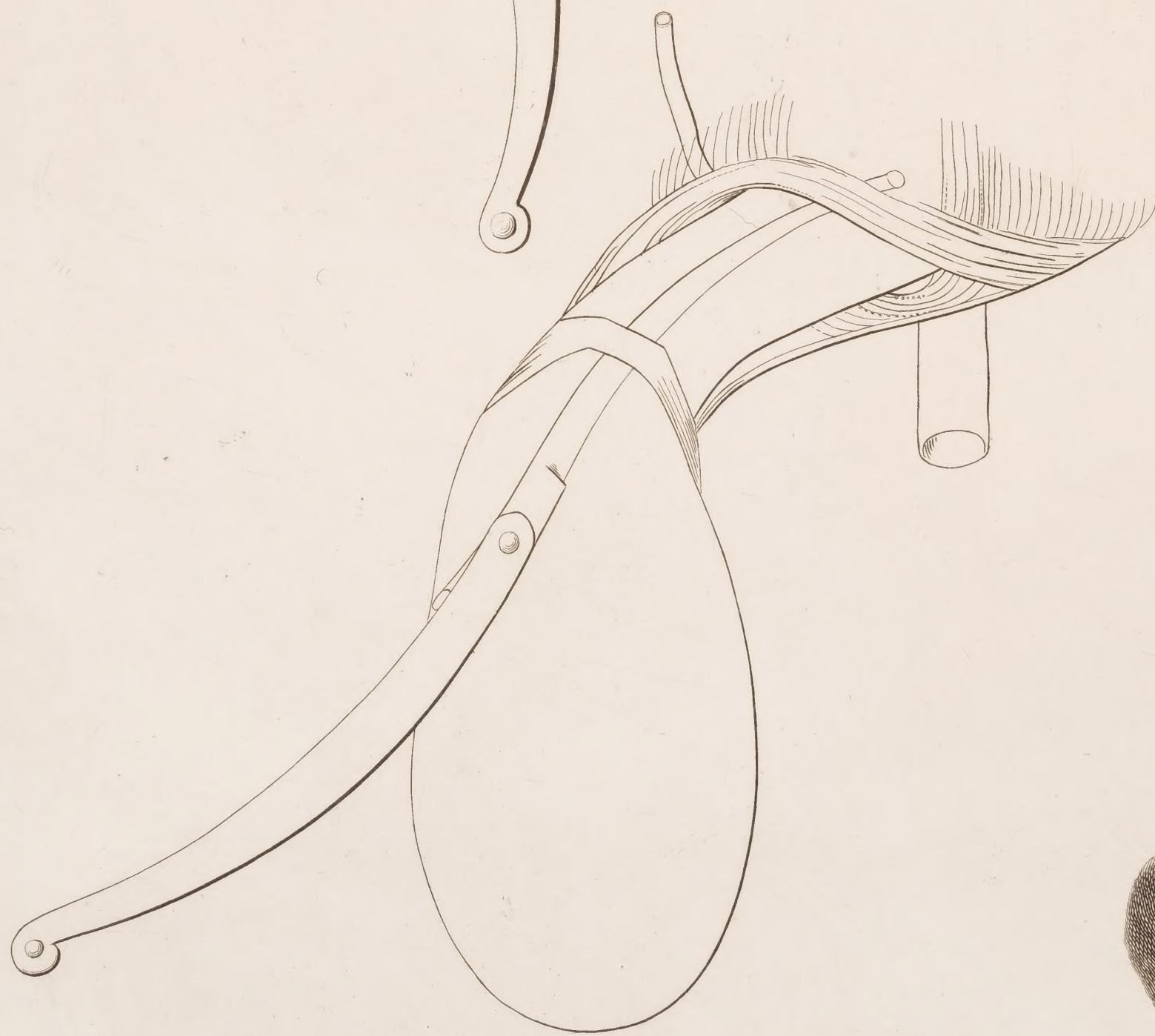
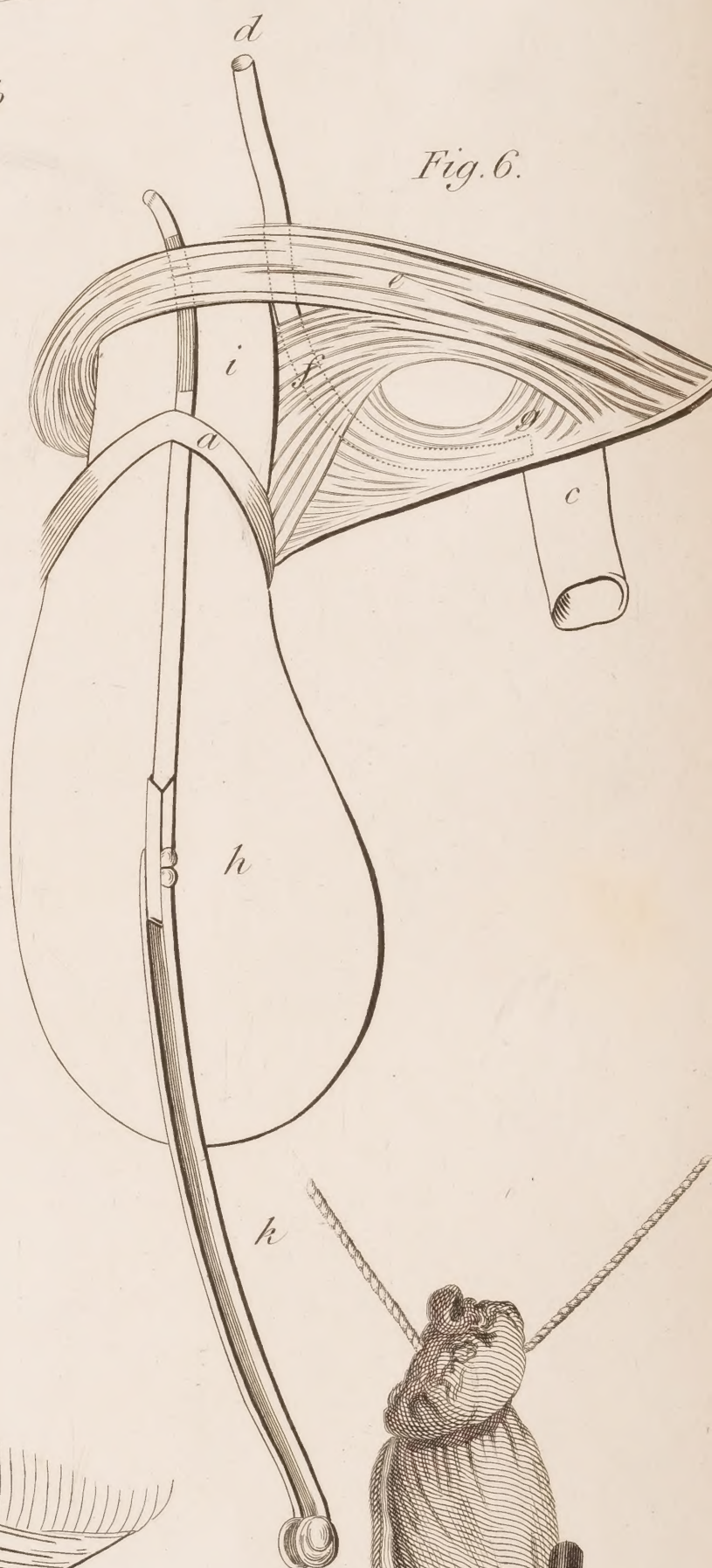


PLATE XI.

THIS Plate shews the hernia congenita under its usual appearance ; also the variety of congenital hernia taken by Mr. Forster from a patient in Guy's Hospital. The other figures shew different views of preparations of inguinal herniæ, intended to shew the mode of operating on each variety.

FIG. 1. *a a a*. Tunica vaginalis.

- b.* Testis.
- c.* Spermatic cord.
- d.* Hernial sac within the tunica vaginalis.
- e.* Mouth of the sac, which has been produced by an adhesion of the tunica vaginalis, opposite the abdominal ring.
- f f.* Intestine.

FIG. 2. *a.* Strangulated intestine, the sac cut open.

- b.* The adhesions of the tunica vaginalis to the mouth of the sac.

FIG. 3. Hernia congenita.

- a.* Abdominal muscles.
- b.* Abdominal ring, and cremaster muscles.
- c.* Fascia upon the tunica vaginalis.
- d.* Tunica vaginalis.
- e.* Spermatic cord.
- f.* Testis.
- g.* Strangulated intestine.
- h.* Bougie within it.

FIG. 4. Inguinal hernia in the female, strangulated at the aperture into the abdomen.

- a.* Abdominal ring.
- b.* Poupart's ligament.
- c c.* Internal oblique muscle and its tendon.
- d.* Transversalis passing over the hernial sac.
- e.* Fascia passing up to the transversalis.
- f.* Hernial sac below the abdominal ring.
- g.* The sac passing under the transversalis into the abdomen.
- h.* Dotted lines marking the direction of the epigastric artery as it runs under the muscles.
- i.* Knife placed with its side upon the sack, the edge of which is to be turned forward to divide the transversalis and internal oblique muscle at *d*. Cutting upwards toward *h* would endanger the epigastric artery.

FIG. 5. Common inguinal hernia.

- a.* Abdominal ring.
- b.* Poupart's ligament.
- c.* Femoral artery.
- d.* Epigastric artery.
- e.* Hernial sac below the ring.
- f.* Hernial sac above the ring.
- g.* The sharp part of the knife introduced between the ring and the sac, with its side placed towards the sac ; its edge is to be turned forwards to divide the ring.

FIG. 6. Hernia on the inner side of the epigastric artery.

- a.* Abdominal ring.
- b.* Poupart's ligament.
- c.* Femoral artery.
- d.* Epigastric artery.
- e.* Internal oblique and transverse muscles passing over the sac.
- f.* Tendon of the transverse muscle passing under it.
- g.* Fascia from Poupart's ligament, from which the cord has been withdrawn to shew the place through which it passes.
- h.* Hernial sac.
- i.* Hernial sac above the ring.
- k.* Knife introduced to shew the manner of dilating the stricture, which is to be always done forwards and upwards opposite to the middle of the mouth of the hernial sac, in all the varieties of inguinal hernia, excepting when the spermatic cord is on the anterior part of the mouth of the sac, when the division should be made outwards.

Cutting upwards is necessary in the variety shewn in Fig. 6, as dividing outwards towards *e* would divide the epigastric artery.

PLATE XII.

FIG. 1. Represents an internal view of an oblique hernial sac.

- a.* Femoral artery.
- b.* Epigastric artery—shewing its course, first below and then to the inner side of the neck of the sac.
- c.* Obturator artery.
- d.* Mouth of the hernial sac.
- e.* Sac within the scrotum.
- f.* Testicle.

FIG. 2. Represents a direct hernia

- a.* Rectus muscle.
- b b.* Peritoneum divided to shew the epigastric artery.
- c.* The epigastric artery, taking its course on the outer side of the mouth of the hernial sac.
- d.* Mouth of the hernial sac.
- e.* Pubes.
- f.* Testis.

FIG. 3. Represents the appearance which an intestine exhibits under the state of artificial anus.

- a.* The upper portion of gut.
- b.* The lower portion of ditto.
- c.* Bougie passed into the artificial anus.
- d.* Narrow portion of gut connecting the upper and lower portions.
- e.* Femoral vessels.

FIG. 4. Represents the division of the epigastric artery, in a case of strangulated oblique inguinal hernia. — The preparation was sent to me by Mr. Lawrence.

- a.* Spine of the ilium.
- b.* Pubes.
- c.* Rectus muscle.
- d.* Mouth of the hernial sac.
- e.* Extremities of the divided epigastric artery.
- f.* Femoral vessels.—See cases.

FIG. 5. Exhibits intestine strangulated by omentum.

- a a a.* Congenital hernial sac cut open.
- b b.* Omentum adhering to the bottom of the sac.
- c.* Bougie passed under the constricting band of omentum.
- d.* Intestine, girt and strangulated by omentum.
- e.* Testis.

FIG. 6. Shews hernia combined with hydrocele.

- a.* Abdominal muscles.
- b.* Hernial sac cut open.
- c.* Hydrocele behind the hernial sac.

FIG. 7. Is the section of an intestine in which an artificial anus had formed after the operation. The case occurred in the practice of the late Mr. Weston, and survived the operation four months.

- a.* Artificial anus, with a bougie introduced.

Fig. 1.



Fig. 3.

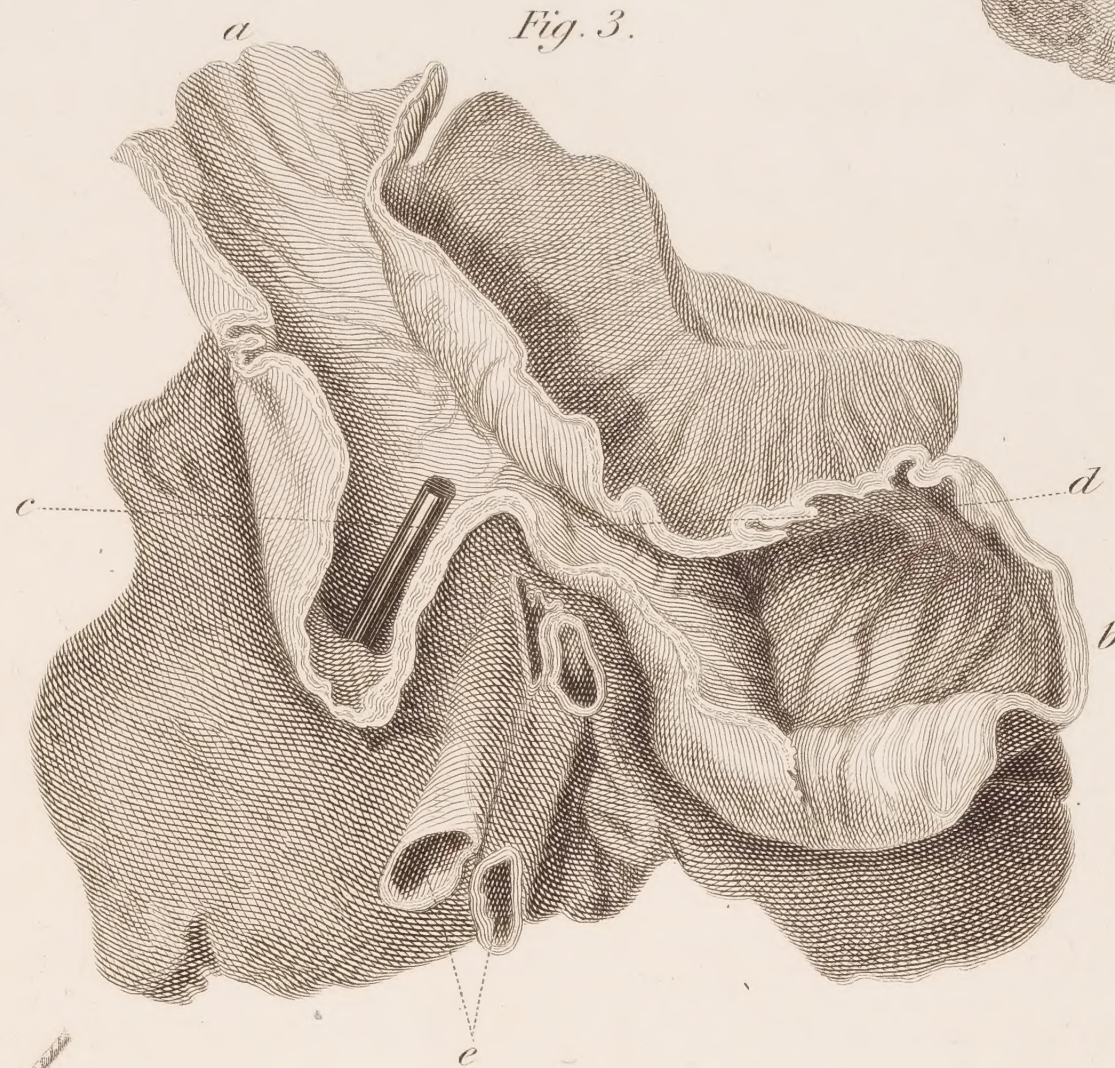


Fig. 2.



Fig. 4.



Fig. 5.

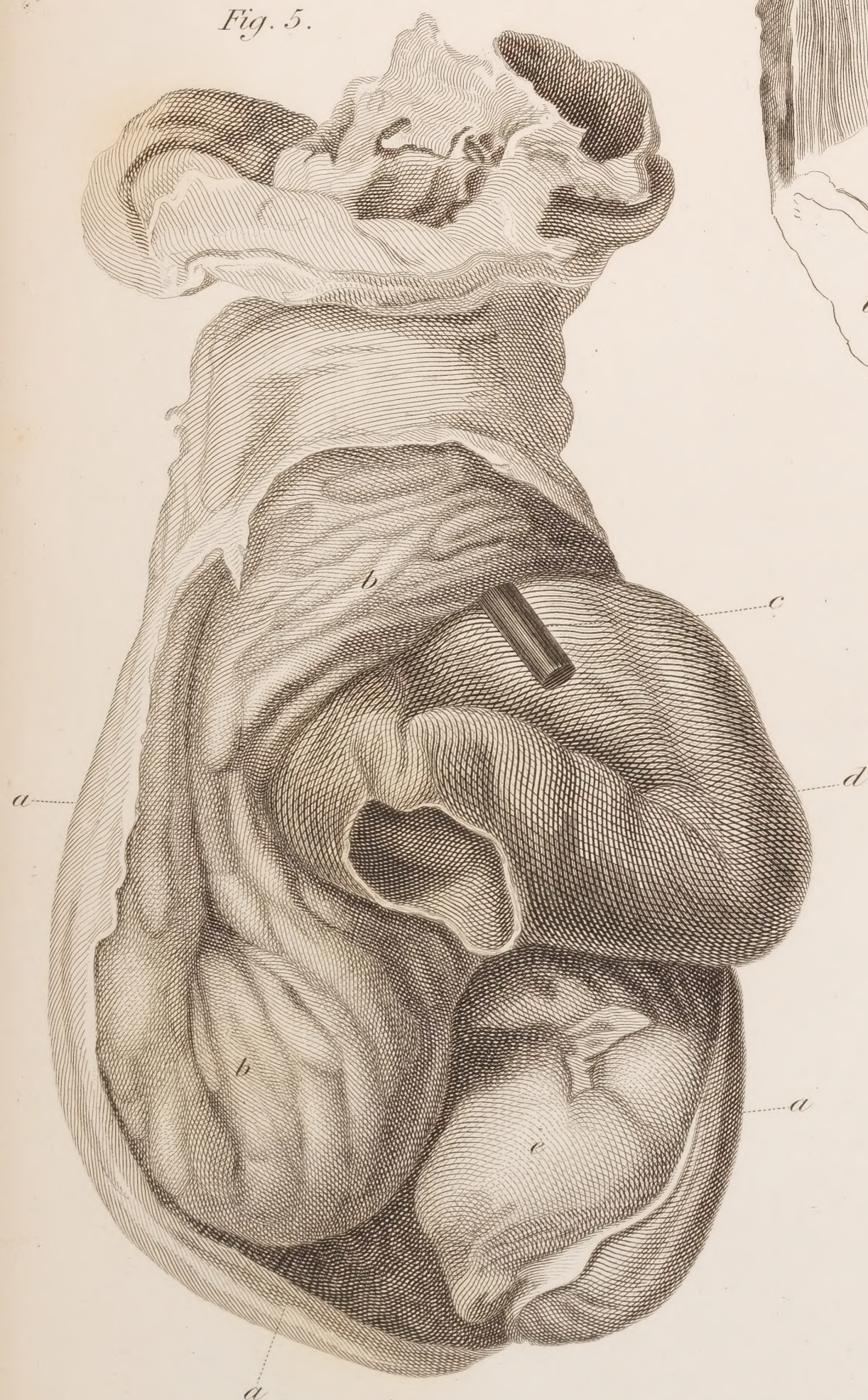


Fig. 6.

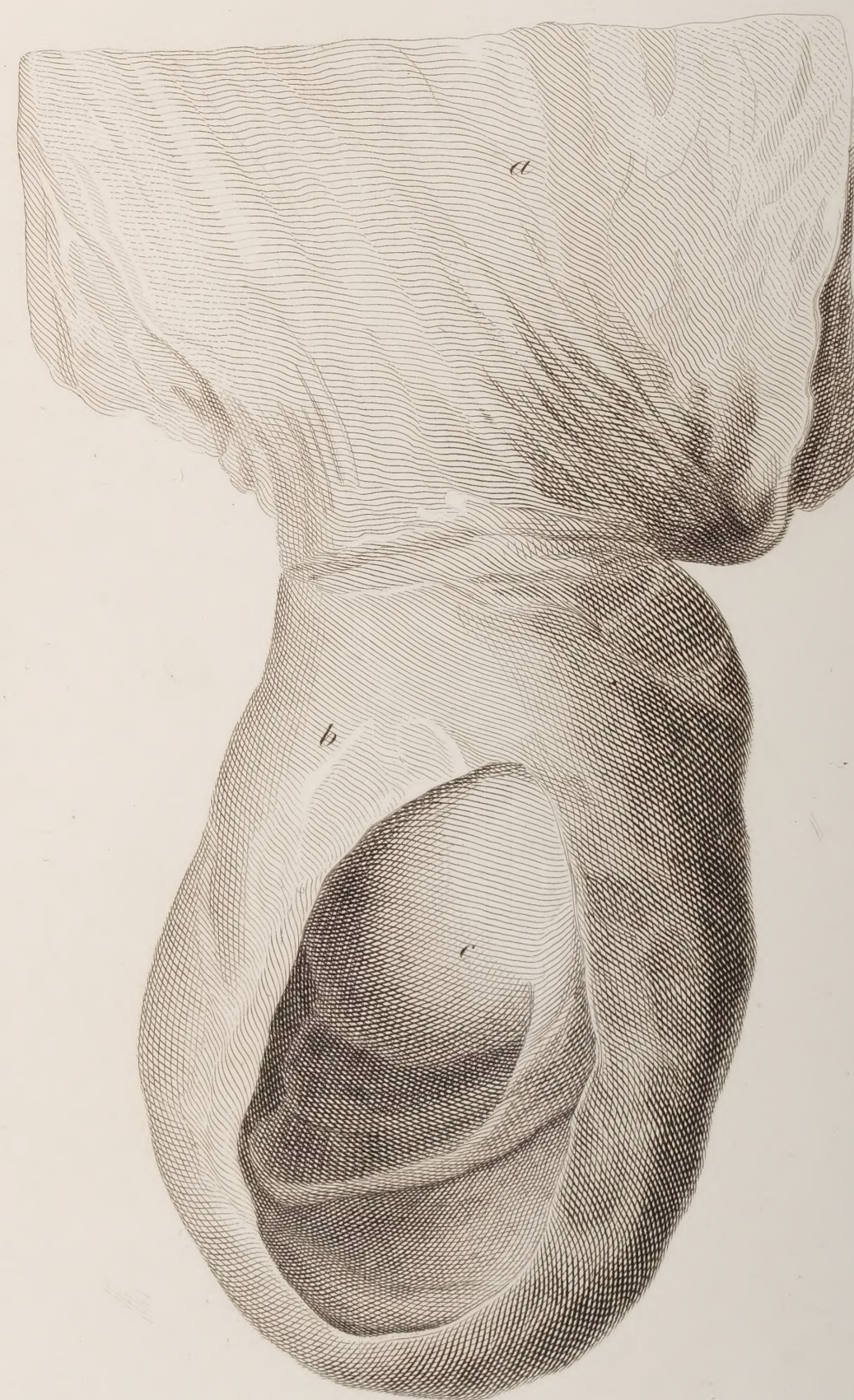


Fig. 7.



Fig. 1.



Fig. 3.



Fig. 2.



Fig. 4.

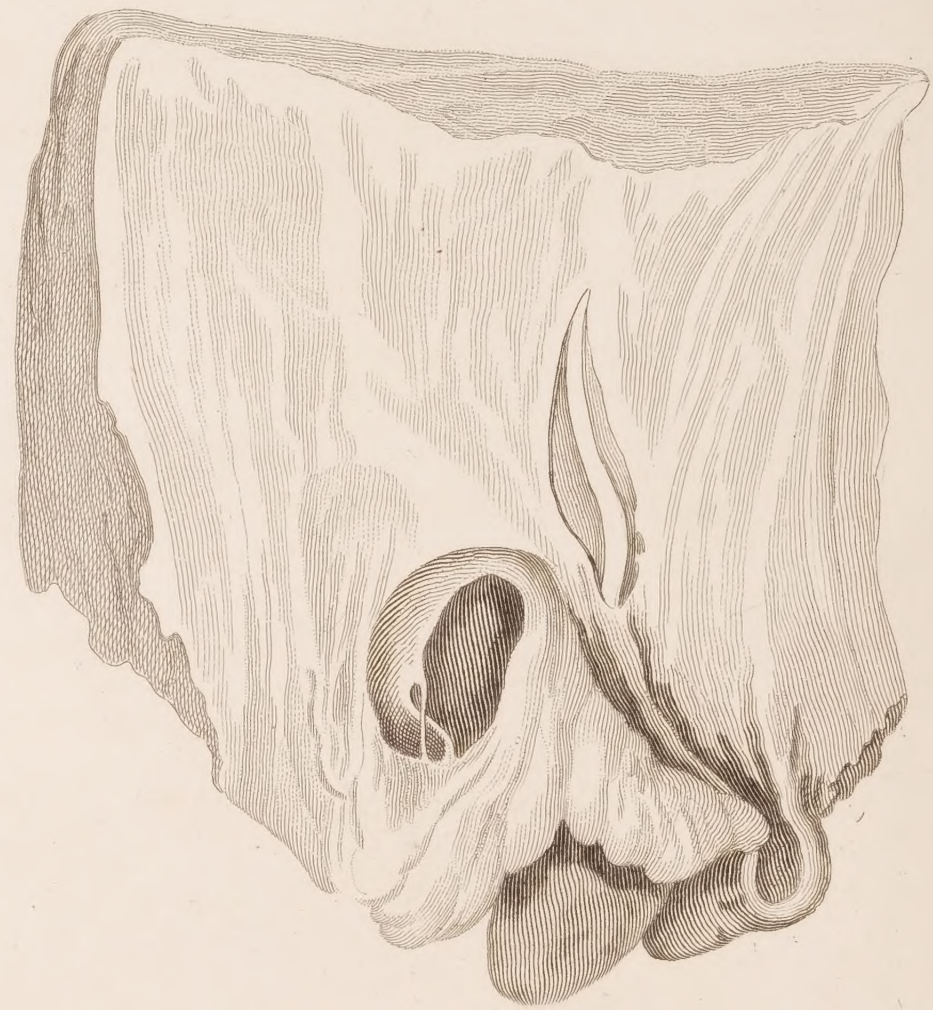


Fig. 5.



Fig. 6.



Fig. 7.



PLATE XIII.

FIG. 1. Represents a peculiar variety of internal hernia, formed by a fold of peritoneum that includes the remains of the umbilical artery.—The case occurred in the practice of Mr. Ring.

- a.* Pouch formed by peritoneum.
- b b.* Remains of the umbilical artery inclosed in the fold of peritoneum.

FIG. 2. Represents a steatomatous tumour in the situation of inguinal hernia in the female.

- a.* Site of the external abdominal ring.
- b.* Fatty tumour proceeding from the inguinal canal and forming a tumour over the pubes somewhat resembling inguinal hernia.
- c.* Femoral vessels.

This and the following case are mentioned page 17, part the first.

FIG. 3. Is a drawing of a steatomatous tumour upon the spermatic cord.

- a.* The tumour, consisting of lobes, which give it the character of omentum.
- b.* Spermatic cord.
- c.* Testis.

FIG. 4. Shews a stricture at the inner ring, formed by a band given off by the fascia transversalis.

FIG. 5. Is a drawing of a vesical hernia alluded to in the text.

- a.* Shews the situation of the external abdominal ring.
- b b b.* Oblique inguinal hernial sac cut open to shew the bladder.
- c.* Tumour, formed by the bladder, covered only on the fore part by peritoneum.
- d d.* Represents an outline of the bladder within the abdominal cavity.
- e.* Testis.

FIG. 6. Shews Fig. 5 more completely dissected.

- a.* Neck of the hernial or peritoneal sac.
- b b.* Hernial sac cut open as in Fig. 5.
- c.* Aperture of communication between the protruded portion of bladder and that within the abdomen; the bladder being in this view cut open.
- d.* Interior of the bladder exposed.
- e.* Epigastric artery, taking the same course as in oblique inguinal hernia of the common kind.
- f.* Abdominal muscles.

FIG. 7. An outline, explaining the descent of the bladder into the scrotum, and the manner in which a vesical hernia receives only a partial covering of peritoneum. The outer reflected line represents the peritoneum descending through the abdominal ring, and giving a partial covering to the fore part of the bladder. The inner line represents the bladder protruding through the abdominal ring; shewing that the lower and back part of the viscus has no peritoneal covering.

SURGICAL TREATMENT

OF

H E R N I A.

PART II.

THE AUTHOR.

DEDICATION OF PART II. OF THE FIRST EDITION.

TO

ALEXANDER MONRO, SEN^R. M.D.

PROFESSOR OF ANATOMY

IN

THE UNIVERSITY OF EDINBURGH,

THIS PART

IS DEDICATED, AS A TESTIMONY OF RESPECT AND GRATITUDE,

BY HIS FRIEND AND PUPIL,

THE AUTHOR.

OF CRURAL HERNIA.

CHAPTER I.*

Of the Symptoms and Dissection of Crural Hernia.

THE first symptom of the disease is pain produced on straightening the thigh, which extends to the stomach, and produces nausea; and when the thigh is examined, an absorbent gland may be more distinctly felt in that groin than in the other, and gives considerable uneasiness even on slight pressure. The first time this pain is perceived is generally at night, when the patient, after stooping to undress, suddenly rises and straightens the limb; and it continues some time after he is in bed, obliging him to lie with the knees elevated, which posture soon relieves him. The cause of the pain on stretching the limb is the extension of the fasciæ of the thigh, and the pressure which they make on the tumour. Symptoms.

The first distinct external mark of crural hernia is a general swelling of the part easily reducible by pressure, descending in the erect, and ascending in the recumbent posture, and which at first seems to be only the dilatation of the sheath that contains the crural artery and vein. The next appearance is that of a small circumscribed tumour, about the size of the finger's end, situated under the crural arch, about an inch on the outside of the tuberosity of the pubes, and lying in the hollow between this process and the crural artery and vein. As the tumour enlarges, instead of falling downwards like the inguinal hernia, it passes forwards and often turns over the anterior edge of the crural arch, this being the direction in which there is the least resistance. As it proceeds, the swelling increases more laterally than upwards or downwards, so as to assume an oblong shape, the longest diameter being in a transverse or horizontal direction. In the female it is generally very moveable, and being soft, and the skin not being discoloured, it has the appearance merely of an inguinal tumour of one of the absorbent glands; but in the male the skin is generally not so loose, the swelling not so distinctly circumscribed, and the tumour appears buried more in the substance of the thigh.

The largest size to which I have seen the tumour arrive, was in cases of which I have given plates in this work. The one was in the male, the other in the female; they were each of them about the size of the fist, and each occupied the whole of the hollow from the anterior superior spinous process of the ilium to the tuberosity of the pubes. But my friend, Mr. Thompson, Professor of Military Surgery at Edinburgh, mentions a case of a woman labouring under an old irreducible crural hernia, in whom the tumour extended half way down the thigh. In this case the parietes of the abdomen were so thin, that the peristaltic motion of the intestine could be distinctly perceived.† Upon the whole, however, it is unquestionable, that the crural hernia is comparatively smaller than the inguinal, and on this account it is more dangerous. Size.

The direction in which the crural hernia passes is obliquely inwards and forwards, and, excepting at first, very little downwards, so that in cutting into this tumour the incision is made into its fundus. This is the general situation of the tumour; but it sometimes happens, that instead of crossing the thigh in the direction of the crural arch, it extends downwards along the edge of the crural vein and the vena saphæna major. Direction.

The crural hernia, when dissected, presents the following appearances: when the skin is removed, the superficial fascia of the external oblique muscle is laid bare, which, though it is of a delicate texture in its common Dissection.

* The anatomy of the parts concerned in crural hernia is given in the first part of the Work.—Ed.

† See a very clear and ingenious Essay on Crural Hernia by Mr. William Wood, surgeon at Edinburgh.

state, when pressed upon by a hernia becomes extremely thickened and very distinct, more especially in a subject loaded with fat. Under this covering there is generally another fascia, precisely of the form of the hernia itself, and which it very closely embraces. A thin fascia naturally covers the opening through which the hernia passes and descends on the posterior part of the pubes. When the hernia therefore enters the sheath it pushes this fascia before it, so that the sac may be perfectly drawn from its inner side, and the fascia which covers it left distinct. The fascia which forms the crural sheath, and in which are placed the hole or holes for the absorbent vessels, is also protruded forwards, and is united with the other, so that the two become thus consolidated into one. If a large hernia is examined, this fascia is only found to proceed upwards as far as the edge of the orifice on the inner side of the crural sheath by which the hernia descends; but in a small hernia it passes into the abdomen as far as the peritoneum and forms a pouch, from which the hernial sac may be withdrawn leaving this, forming a complete bag over the hernia. In a small hernia the bag is thicker than the sac itself, but by being gradually extended it becomes thinner and less distinct, and in one example of this kind from the female subject (which forms the subject of one of my plates), this and the superficial fascia have coalesced into one. I first observed this fascia in dissecting a male subject brought into Saint Thomas's Hospital in the year 1800, who had a strangulated crural hernia on the one side, and a reducible one on the other; the dissection of which is preserved in the Museum of Guy's Hospital: I next saw it in the operation performed upon Mrs. Bispham hereafter to be mentioned, and have ever since demonstrated it in preparations whilst delivering my lectures on crural hernia. This fascia will be seen in almost all the plates, and in one of the drawings of plate four very distinctly, as the hernial sac is removed from its inner side. It may be termed the *Fascia Propria* of the crural hernia. When this fascia is divided, a quantity of adipose membrane is found between it and the sac, and when this is cut through, the peritoneal sac itself is exposed. Behind the hernial sac is the fascia lata, and the sac rests in the hollow between that part of it which covers the crural vessels, and that which passes over the pectineus and triceps muscles, so that the fascia lata is situated posteriorly to the hernia.

Fascia propria.

Form of the sac.

The form of the sac in crural hernia differs from that of the inguinal: the shape of the latter is pyriform, but the fundus of the crural bears a very large proportion to its orifice, and the form of the sac when inflated and dried is generally that of the following outline.

Seat of its orifice.

The orifice of the sac is surrounded by a fascia or cellular membrane, much condensed by an adhesive process which forms with the fascia below a complete bag, out of which the hernia may be drawn and the bag left behind perfect. Between the orifice of the hernial sac and the tuberosity of the pubes is situated the insertion of the external oblique muscle into the linea ileo-pectinea, and ligament of the pubes. Behind it, is the os pubis covered by its ligament and fascia iliaca; anterior to it, is the beginning of the posterior edge of the crural arch, and below this the lunated edge of the fascia lata and part of the crural sheath; and on its outer side is a thin process of fascia, which passes between it and the iliac vein. Indeed, it is according to the size of the hernia that there is more or less remaining of the original fascia, which extends from the insertion of the external oblique to the iliac vein. If the hernia is small, a process of this fascia remains round the orifice of the sac; but if it is large, the orifice of the sac occupies the whole space between the insertion of the external oblique and the crural vein; excepting that a thin portion of fascia still remains between the vein and the sac. This vein runs on the outer side of the hernial sac, about half an inch from the centre of its orifice, and half an inch beyond the vein; and exterior to it is the centre of the external iliac artery: the epigastric artery arises from the external iliac, about three quarters of an inch from the centre of the sac, and as it passes forwards and upwards it approaches this point about a quarter of an inch nearer. The general distances of the different parts are as follows.

Male.

Inches.

From the symphysis pubis to the centre of the orifice of the sac	2
From the centre of the orifice of the sac to the external iliac artery	1
From the centre of the orifice of the sac to the centre of the external iliac vein	0 2-4ths.
From the centre of the orifice of the sac to the origin of the epigastric artery	0 3-4ths.
From the centre of the orifice of the sac to the inner edge of the internal abdominal ring	1
From the tuberosity of the pubes to the centre of the orifice of the crural hernia	1

Female.

Each measurement is from one-eighth to one-fourth of an inch more where the female pelvis is large and well formed, than in the male.

Measure of distances.

The spermatic cord of the male, and the round ligament of the uterus of the female, pass about half an inch anterior to the mouth of the hernial sac, being first situated to the outer side, and afterwards crossing its fore part.*

Spermatic cord.

When the opening through which the hernial sac has passed is examined anteriorly, it will be found that the sac, after descending a little way into the crural sheath, turns inward and protrudes the inner part of this sheath where the absorbent vessels pass. The hernial sac is here placed between two columns of fascia of the crural sheath; the one proceeds from the anterior part of the insertion of the external oblique muscle into the pubes, is reflected behind the crural vein, and passes over the neck of the sac: the other arises from the point of insertion of the external oblique into the linea ileo-pectinea and ligament of the pubes, is continued behind the neck of the sac, and is at last undistinguishably blended both with the fascia that covers the crural vein, and with that part of the fascia lata which passes over the pectineus muscle. See *Plate 2 and 3*.

Direction of the sac.

The same general symptoms characterize crural as inguinal hernia; it appears in the erect, and disappears in the recumbent posture; it dilates when the patient coughs, is elastic and uniform to the touch when it contains intestine, and gives a gurgling noise when it returns into the abdomen. When it contains omentum the surface is less equal, it feels doughy, and gives no particular sound when it returns into the abdominal cavity.

Diagnosis.

The crural hernia is less liable to be confounded with other diseases than the inguinal, because tumours of the groin from other causes, are much less frequent than those of the scrotum, but still great care is required to prevent the practitioner from mistaking the disease, and persons have, to my knowledge, lost their lives from such errors, or from the swelling being altogether overlooked.

It would scarcely be supposed that crural hernia could be mistaken for a glandular enlargement of the groin, yet such a mistake has been made, as the following instance will shew: A man who was sent into Guy's Hospital for this complaint by a surgeon in considerable practice, had been poulticed for three days for what was supposed to be a venereal bubo, and when the operation was performed the intestine was found mortified. In the following case, which I detail on the authority of Mr. Bethune, a crural hernia was opened under the idea of its being a suppurating gland, the stools were discharged at the opening, and the patient soon after died.

Enlarged gland.

Hernia mistaken for an Abscess.

Mr. Bethune, surgeon, of Woodford Bridge, informed me he was witness to the case of a person who had a tumour in the left groin attended with an interrupted state of the bowels, to which a poultice was applied, under the idea of its being in the progress to suppuration. After the symptoms had continued three days the tumour was opened by a small incision, and air immediately escaped from the wound. A discharge of feculent matter succeeded, accompanied with symptoms of inflamed intestine. When clysters were injected a part of them escaped at the wound in the groin, and the patient died in ten days after the opening had been made. It was probable that the sigmoid flexure of the colon had been contained within this hernia.

Case.

Now such mistakes as these must arise from inattention to the patient's account of the progress of the case, to the circumstance of the tumour appearing in the erect, and disappearing in the reclined posture, and especially being dilated on coughing, together with a general irregularity of the bowels, costiveness, eructation, and vomiting. The following case, however, will serve to shew the necessity of minute attention in cases of this kind.

I was called to a lady, aged fifty-five years, by Mr. Owen, apothecary to the Universal Dispensary, who had laboured from Wednesday the 12th of November, to Friday the 21st, 1806, under symptoms of strangulated hernia. She had been attended by a physician and apothecary for *ileus*, but had not mentioned to them her having a tumour in her groin. Mr. Owen discovered a swelling in the right groin, which he told me was extremely hard, and did not feel to him like a hernia; yet he supposed from the symptoms it could only be that disease. Upon examination I found a gland enlarged to the size of a pullet's egg and very moveable, but upon feeling behind this gland I could perceive an elastic tumour distinct from the swollen gland. I pressed upon it for about seven minutes, when a part of the tumour suddenly slipped into the abdomen, and in about three minutes more the remainder returned with a gurgling noise. Fifteen minutes afterwards she had a stool, and had several others in the evening, when all the symptoms of strangulation had ceased. The glandular tumour still remains. This case struck me as important, both for the duration of the symptoms of strangulation, which was ten days, as well as from the combination of the two diseases.

Case.

The psoas abscess and crural hernia have some symptoms in common, and therefore a surgeon may be deceived by this disease. The seat of the tumour when first perceived is nearly the same, it dilates when the person coughs precisely as hernia does, and it is rather fuller in the erect than the recumbent posture. The distinguishing marks of the two diseases are, that the psoas abscess is preceded by pain of several weeks duration

Psoas abscess.

* When femoral hernia is accompanied with an inguinal rupture on the same side, the course of the spermatic cord is much changed by the obliquity of the inguinal canal being no longer preserved. The cord, instead of lying anteriorly to the neck of the femoral sac, lies to its inner side. Cloquet, in his *Recherches Anatomiques*, mentions an instance of this.—Ed.

in the loins, that though the posture makes a sensible difference in the fulness of the tumour, it rarely entirely returns into the abdomen; a sense of fluctuation also may generally be felt; and its situation, though nearly that of crural hernia, is generally rather more towards the spinous process of the ilium. It is also unconnected with an interrupted state of the bowels; and lastly, the enlargement of the tumour, when it has appeared in the thigh, is much more rapid than that of a hernia. Fatal errors, however, are not so likely to occur, from confounding these diseases as the former, because the psoas abscess requires no immediate active attention on the part of the surgeon, and sufficiently distinctive marks will arise whilst he is waiting for the further progress of the disease.

Mistaken for
inguinal.

But the error which is the most frequent, and by far the most dangerous, is that of mistaking crural for inguinal hernia. It is dangerous during the operation of the taxis, as the direction of the pressure should be entirely different in the two diseases; and it is extremely dangerous in the operation, particularly if the surgeon's usual habit of operating in inguinal hernia is to make the incision upwards and outwards towards the spinous process of the ilium. Several instances of such mistakes have come to my knowledge. I once went with a physician into the country to operate, as I was told, on a case of inguinal hernia, but when I examined the patient, I found that the hernia was crural, and had been three days strangulated, during which time repeated attempts had been made to reduce it by pressing the tumour towards the spinous process of the ilium. It was reduced in five minutes by employing pressure proper for the crural hernia.

A surgeon who had operated on a crural hernia sent his patient afterwards to London, to request that a proper truss might be procured for her, and in his letter stated, "that, during the operation, he had found the stricture in this case at the abdominal ring." He was fortunate in having escaped destroying his patient. Another surgeon in operating in a supposed *inguinal hernia* had a venous hæmorrhage arise, which delayed the operation fifteen minutes, and which he found it was difficult to stop. It was a crural hernia, and it was probably the crural vein which he had injured, as he cut towards the spinous process of the ilium. This dangerous mistake is liable to happen without considerable attention, as the crural hernia, after descending into the thigh, often turns upward before the crural arch. The marks of distinction, as far as I have been able to observe, are the two following: first, that the neck of the inguinal hernia is situated above the tuberosity of the pubes, but that of the crural below it and to its outer side; and secondly, if the sac is drawn down in the crural hernia, the crural arch may be traced above it. If these two circumstances are carefully attended to, the disease will not be confounded by those who have studied the natural structure of these parts.

Varicose crural
vein.

An enlargement of the crural vein may be mistaken for a crural hernia. Mr. Hosegood, surgeon in the Borough, requested me to see a patient of his who had a tumour in the groin, which dilated when she coughed, disappeared in the recumbent, and reappeared in the erect posture, and which he informed me had been supposed to be a hernia. It was easy to detect the nature of the case, for, although it disappeared in the recumbent posture, it was immediately reproduced, although she continued in that posture, by pressing on the vein above the crural arch, and retarding the return of blood. She died of a stricture in the colon; and, upon inspecting the body, I found that I could readily thrust my finger into the crural vein, but that she had no hernia.

Steatomatous
tumour.

I lately dissected a person whose case is detailed hereafter, and who had an artificial anus in consequence of the operation for hernia, in whom I found on the left side a steatomatous tumour occupying exactly the place of a crural hernia. It appeared that this woman had laboured under crural hernia, that the sac had gradually contracted, for a very small portion of it remained in the crural orifice, and that the space had not only been occupied by fat, but that this had grown into a tumour of considerable size. I have made a preparation of this tumour, and have given a drawing of it in the plates of this part of the work.

Hydatid tumour.

Dr. Monro, jun., mentions an instance of an hydatid tumour which was removed from the upper and inner part of the thigh, which might easily be mistaken for a hernia; and he gives another example of it from Dessault, who found it transparent when a candle was brought near to it, and that he could draw it from the crural arch so as to leave a space between the tumour and abdomen, which proved that it was not formed from it.

Plurality of sacs.

Two herniary sacs have been stated to pass behind the same crural arch; but, although I would not be understood to deny their existence, I have not seen an example of sacs having two separate orifices into the cavity of the abdomen; but I have known one hernial sac descending into the sheath for the crural vessels and crossing the anterior part of these, and another portion of it quitting the sheath and extending in the usual direction upon the thigh.

Occurs most in the
right side.

Crural hernia occurs more frequently on the right side than on the left, and, probably, because the greatest exertions are generally made on the right side. On dissection, however, I have generally found that if there was a large hernia on one side, a small one could be detected on the other, though, for the most part, not such as had been discovered during life.

Crural hernia occurs more frequently in the female than in the male, which arises partly from the difference which has been described in the parts behind the crural arch; and partly because the orifice for the spermatic cord in the male is so much larger than that of the round ligament in the female, inguinal hernia is a more frequent occurrence in the male, which has a tendency to prevent the crural. I have, however, known both inguinal and crural hernia exist on the same side in the same subject; but only in two examples. Sometimes crural hernia is found on one side, and inguinal on the other; and an example will be found in one of the plates of a crural and inguinal hernia (the latter of which had been cured by adhesion), on one side, and on the other side an inguinal hernia still remaining open. Of this specimen I have given two different views, as it conveys a very clear idea of the relative situation of parts in both these species of hernia. Women who have borne children are more subject to this disease than others, and, probably, because the extension of the abdominal muscles, during gestation, leave after delivery the parts under the crural arch in a state of relaxation.

Most frequently the female.

Crural and inguinal in the same subject.

The crural hernia most frequently contains intestine only, and generally the ileum, sometimes both intestine and omentum; but I have seen only two instances of it containing merely omentum. The cæcum is sometimes in the hernia of the right side. The ovaria have also been found in crural hernia, and in one of my plates the uterus will be seen drawn to the orifice of the hernial sac.

Contents.

The youngest period at which I have known the disease to occur was seven years of age. The patient was a girl who was very much weakened by scrofulous complaints: she had worn a truss about half a year. I have also seen it at eleven years; and next in point of age was a lady of nineteen years, a patient of Mr. Shuter's, on whom I performed the operation, and whose case is hereafter related. The frequency of this disease is proportionate to the age of the person; and one reason independent of the relaxation of age, that old persons are so much more subject to crural hernia than the young, is, that the psoas and iliacus internus muscles, in consequence of the more sedentary habits of advanced years, become of less size than at an earlier period of life; and as they occupy less space behind the crural arch, there is more room for a dilatation of the crural sheath. The fasciæ also in age are much weakened by absorption.

Age.

The causes which produce crural hernia are nearly the same as those that occasion the inguinal, and which have been already detailed in the former part of this work. They are, in general, whatever increases the pressure of the viscera and lessens the resistance of the parietes of the abdomen. But there is one circumstance in which they differ, for I have never known the crural hernia produced by a blow; this disease is the effect only of gradual pressure and extension of parts, their construction being such as scarcely to allow of laceration without extreme violence. The term *rupture*, therefore, is peculiarly inapplicable to this species of hernia.

Causes.

During the enlargement of the uterus in pregnancy, crural hernia generally disappears; but I saw with Mr. Richard Pugh of Gracechurch Street, a large crural and umbilical hernia in a lady between five and six months gone with child.

I some time since was applied to by a man, who had a femoral hernia on each side brought on by efforts to expel his urine in consequence of a stricture. That on the left side was small, and entirely situated within the sheath of the vessels; that on the right side was large, and had protruded through an aperture in the sheath.

CHAPTER II.

Of the Reducible and Irreducible Crural Hernia.

THE crural hernia is found in the three states of reducible, irreducible, and strangulated.

As the opening through which this hernia passes is of very small diameter, the subject of it is in great and constant danger of losing his life by obstruction in the bowels; and though when it is reducible it returns into the abdomen during the night, yet this is done with less facility than in inguinal hernia, and symptoms of strangulation are liable to occur from any distended state of the bowels, and irregularity in the digestive functions.

Dangerous state of the patient.

The reduction by the taxis or manual skill, is also much more difficult in this than the other species of hernia, and in consequence of the smallness of the opening through which the intestine descends, and the direction which it takes, a different management is required in this operation. The method is the following: the position of the

Taxis.

patient is to be such as to relax the abdomen as much as possible, for which purpose the shoulders should be elevated, and the thighs bent at right angles with the body; but even this posture produces but little effect, unless the knees at the same time are brought together. If the parts are dissected directly with the view of observing what difference it made in the relative tension of parts in the dead body, it will be found that when the thighs are extended, the crural arch and all its fasciæ are upon the stretch; when the thighs are bent, but the knees turned outwards, the fasciæ are somewhat relaxed; but when the thighs are bent and the knees brought together, the crural arch and its fasciæ are all extremely loosened, and still more are the parts loosened by throwing one thigh, when bent, across the middle of the other. When the body is in the recumbent posture, the thighs bent, and the knee thrown inwards, the surgeon is to place himself over the body of the patient, and putting both his thumbs on the surface of the tumour, he is to press gently directly downwards, as if he were endeavouring to press the tumour into the thigh rather than towards the abdomen. If this pressure is steadily kept up for some minutes till the surface of the tumour is brought even with the line of the crural arch, the hernia may then be pressed towards the abdomen and will return into that cavity. I am convinced that much of the difficulty found in returning this species of hernia often depends on the improper direction given to the pressure; for if the tumour is pressed at first towards the abdomen, it turns over the crural arch instead of passing under it, and then the utmost degree of force which may be applied will only endanger the bursting of the intestine, but cannot contribute to its reduction.

Direction of the pressure.

Pressure gentle, and continued, not forcible.

The same general precautions that were mentioned, when treating of inguinal hernia, apply to the reduction of the crural, so that when the position of the patient and the direction of the pressure are correct, the reduction is to be attempted by long continued and gentle pressure, avoiding all kind of violence, which can be of no service in accomplishing the end in view, and may be productive of much and very serious mischief; examples of which I have given in my former volume, and others equally impressive I have since seen in the form of the disease of which we are now treating.

Truss.

A spring truss is the only method of preventing the danger to which this disease exposes the sufferer, and the observations made in the former volume on the application of this instrument in inguinal hernia, will apply (with some few exceptions) to the crural. Indeed, if the hernia is small, precisely the same truss should be applied for crural hernia as that which is constantly worn for the inguinal; but it must be placed rather lower than for the inguinal hernia; but though this answers the purpose in a small hernia, a truss of a different kind is required if the hernia is large, because the orifice of the hernial sac is proportionally more extended.

Distance of the apertures.

The distance between the crural ring and the upper abdominal ring is just an inch; and between the lower abdominal ring and the middle of the crural hole is also about an inch; and this aperture is from half to three quarters of an inch below a line drawn from one abdominal aperture to the other. It is, therefore, necessary that the bearing of the pad of the truss should be from half to three quarters of an inch lower down than in inguinal hernia, and should also press on the upper part of the thigh. For this purpose it is best that the pad of the truss be bent somewhat downwards, and not, as in the inguinal truss, continued nearly in a line with the spring. It will then rest in the hollow at the upper part of the thigh on the outer side of the tuberosity of the pubes; and as it lies upon the crural arch, the motions of the thigh will have no tendency to displace a truss thus constructed, which, with an inguinal truss pressed downwards to cover a large crural hernia, is an inconvenience constantly felt on every violent exertion. In the plate which shews inguinal and crural hernia on the same subject, the truss will be seen bent as much as is ever required for crural hernia, and between this and that which is there seen and applied for inguinal hernia all the varieties will be comprehended.

Permanent cure unfrequent.

Cause of.

A truss thus formed and regularly worn will have the effect of preventing the descent of the hernia, and may in process of time entirely obliterate the mouth of the sac. But I must say, that, as far as I have had an opportunity of observing, this effect is not so frequently produced in the crural as in the inguinal hernia; for I have known persons wear a truss for a great length of time, yet as soon as it was discontinued the hernia has descended with very little diminution of its original size. The reason of this, I believe, is, that when once a hernia has been formed, and the crural aperture consequently dilated, the opening from the abdomen becomes nearly perpendicular when the body is erect, and the pressure of the contents of the abdomen, on this account, is always the greatest and most direct at the time when pressure operates with the greatest force. Whereas in the inguinal hernia the direction of the upper part of the sac is oblique; the abdominal viscera press together the sides of that part of the canal which lies between the two rings, and thus it becomes more easily contracted, so long as the passage into it maintains some degree of its original obliquity. Another reason of the comparative unfrequency of the cure of crural hernia by pressure, is, the constant variation in the tension of the crural arch on every motion of the body, which must as constantly alter the pressure of the truss, and

destroy that uniformity of action on which the gradual obliteration of the opening into the sac may be supposed to depend.*

Whether this be the true explanation or not, the fact is that this hernia is more liable to reappear, so that the truss must be worn night and day, and continued for some years before it will be safe to leave it off and make a trial of the effect which it has produced.

The mode of measuring a person for a truss in crural hernia is the following: place him in a recumbent posture, return the hernia, and then putting the finger upon the orifice of the hernial sac, desire him to rise, and if the hernia does not descend, carry a piece of tape from under the finger round the pelvis, midway between the trochanter major and the spine of the ilium, and bring it round to the point from which the measurement began. Any intelligent instrument-maker from this measure will be able to make a truss of a proper length. The angle which the pad of the truss is to form with the spring, should be somewhat more than a right angle for the largest hernia, and gradually approaching to that for the inguinal in the smallest.

Mode of measuring
for a truss.

If the crural hernia extends far down on the thigh, instead of turning upwards towards the crural arch, it is owing to the aperture on the side of the crural sheath being very large, and under these circumstances there is great difficulty in keeping the intestines within the abdomen. In this case it is necessary that the pad of the truss should be of great length, and the spring unusually strong; and it will also be useful to carry a strap from the lower part of the pad round the upper part of the thigh, to prevent the pad from rising out of its proper place.

Hernia large and
descending.

When a hernia exists on both sides a double truss will be required, which is to be constructed upon the same principles as the single truss, and is to be made to buckle behind, so that it may be easily adjusted to the shape of the wearer.

Double truss.

I have lately seen an ingenious person from Scotland of the name of Hinchliffe, who shewed me trusses, the spring of which was made of whalebone instead of steel; and if its elasticity is not affected by the heat of the body or change of climate, this must prove a great improvement on the common truss, as the steel of the latter will rust, and the spring will sometimes give way in situations in which another cannot be readily procured.

Whalebone truss.

With respect to variations in the form of trusses, which every man, whether he knows any thing of the structure of the parts or not, thinks he has a right to make, I shall only observe, that the less complicated a truss is the better; first, because it answers the purpose more completely of keeping the hernia in the abdomen; and secondly, because if it is out of order, which it is very apt to be, it is more difficult to get it repaired, and a person with a complicated truss, whilst it is repairing, is constantly exposed to the danger of having his hernia strangulated. There is no difficulty in applying a proper truss if the seat of the aperture is known.

More simple the
better.

Of the Irreducible Crural Hernia.

As far as I have had an opportunity of observing, there are three causes by which the crural hernia is rendered irreducible; the one, the formation of adhesions between the omentum or intestine, and the inner side of the hernial sac; another, so great a growth of parts that they become too large to repass into the cavity of the abdomen; and the third, a contraction of the hernial sac.

Causes of.

With regard to the first of these causes, I must observe that I have very rarely seen the intestine adhering, and that I do not believe it is so frequent an occurrence in the crural as in the inguinal hernia. I have, however, twice seen it adhering in cases in which the operation was performing; in the first, the adhesions were of recently effused lymph which could be readily torn through: and in the second, they had existed long, and formed firm membranous bands which required a division by the knife. I have also in the dead body seen a very firm adhesion of the intestine to the inner side of the sac, leaving no space between the inner side of the sac and the surface of the intestine.

Intestine adheres.

The omentum is often found adhering to the sac; but this is a circumstance of little importance in the operation: whereas an adhesion of the intestine increases much the difficulty of the operation, and adds greatly to its danger.

Omentum adheres.

* Femoral hernia when large does not readily admit of cure, from the difficulty of making pressure on the upper aperture of the crural canal, or that opening by which the hernia leaves the abdomen. The crural ring is situated out of the reach of pressure; it lies immediately under Poupart's ligament, which effectually prevents the pressure of a truss producing adhesion between the sides of the neck of the sac. The only period when it admits of radical cure, is perhaps when the sac is small and can be returned into the abdomen. In femoral hernia the sac, if not large, adheres so loosely to the surrounding parts that it admits for a considerable time of being returned into the cavity of the abdomen; indeed, in dissection a femoral hernial sac will often escape notice, in consequence of being drawn from the sheath and lying loose at the femoral aperture on the outer side of the umbilical artery.—ED.

Ulceration of intestine.

Adhesion of the intestine to the inner side of the sac, is sometimes followed by ulceration, of which the following case, which Mr. John Kent, Surgeon, in the Borough, has communicated to me, is a good example.

Case.

Mrs. B., the wife of a butcher in the Borough, had a crural hernia in the right side, which had existed twenty years. When Mr. Kent was called to her, she had complaints which indicated a diseased state of the abdominal viscera, and accidentally mentioned a swelling in the right groin. Upon examining this he found it ulcerated to about the extent of a shilling, and fæculent matter was frequently discharged at the orifice, though the fæces still, in part, passed by the anus. She suffered a long time under this disease, and at length died dropsical.

Growth of parts.

The growth of the protruded parts, the second cause which I have mentioned as rendering this hernia irreducible, arises from neglecting to wear a truss; so that the omentum having for a long time remained unreturned increases with the bulk of the body, dilates the sac on each side, and becomes at last so bulky, that it can no longer be returned through the small orifice through which it originally descended. (*See Plate 5.*)

Treatment of.

Under these circumstances it becomes highly desirable that pressure should be made upon the hernia, so as to prevent its increase; and I have had the pleasure of observing that under this treatment the increase of the swelling is entirely prevented, and even a gradual absorption of the protruded parts has taken place, so as to prevent the troublesome bulk of the swelling, and to make it almost entirely disappear. The intestine, however, must be first carefully reduced.

Case.

Mr. Gaselee, of High Street, Borough, requested me to accompany him to see a gentleman who had long suffered under an irreducible crural hernia. I tried to pass it back into the abdomen, but without success. I then ordered a truss for him of the usual form of that used for hernia, but hollowed out so as to embrace the surface of the swelling, by the use of which the swelling very soon lessened and ceased to become troublesome, and in a few weeks it had almost entirely disappeared.

I prefer a hollow truss to one of the usual make, as the pressure which it exerts is easier to the patient, and may be worn without pain for a sufficient length of time.

Pressure cannot be borne in the intestinal.

But if the hernia is intestinal the pressure of a truss, even thus constructed, cannot be borne in the crural hernia; for I applied one on the intestinal crural hernia of a lady whom I attended with Mr. Pugh, and it gave her so much pain that it was obliged to be discontinued after a few hours.

Contraction of sac.

The contraction of a portion of the hernial sac is another cause that renders hernia irreducible; an example of which I have in my possession in a large hernia, in which the contraction was situated an inch below the orifice of the sac, and had been occasioned by the pressure of the lunated edge of the fascia lata; but generally this contraction is at the mouth of the sac, and is more frequently found there than in the inguinal hernia.

CHAPTER III.

Treatment of Strangulated Crural Hernia and Operation.

Symptoms and causes of strangulation.

As the symptoms of strangulation have been detailed in the account of the inguinal hernia in the former part of this work, it is unnecessary to repeat them here. The same may be observed of the causes of strangulation, which are generally the same, viz. sudden distention of the abdominal viscera; great exertion of the abdominal muscles, more especially in lifting a heavy weight in a stooping posture; flatulent vegetable food, or any food difficult of digestion.

Three seats of the stricture.

With regard to the seat of the strangulation in crural hernia, it will be found in three different situations.

First, in the crural sheath, and semilunar or lunated edge of the fascia lata.

Secondly, at the posterior edge of the crural arch.

Thirdly, in the mouth of the hernial sac, and fascia which covers it.

Orifice of the crural sheath, and semilunar edge of the fascia.

With respect to the first of these, it will be found that a portion of the crural sheath remains below the crural arch, which forms a strong circular band by which the hernial sac is surrounded. When the sac is drawn from the sheath in the male, the orifice by which it has passed will be found to be formed by two strong columns of fascia, one passing above, and the other below the sac, and meeting on the inner side at the posterior insertion

of the external oblique muscle into the ligament of the pubes, and on the outer side at that part of the sheath which covers the crural vein. In the female these columns are not equally strong, still a portion of the sheath surrounds the hernial sac. (*See Plate 2 and 3.*) If the hernia is large, it reaches to the semilunar edge of the fascia lata, and is compressed by it.

The second place at which the stricture is found, and which requires division in large crural herniæ, is the posterior edge of the external oblique muscle and the fascia transversalis, which pass before the mouth of the hernial sac, and which extending inwards to be inserted into the pubes, form also the inner boundary of the sac at this part, whilst a small process of fascia on the inner side of the vein forms its outer boundary. Thus then there are two seats of stricture, one the edge of the aperture in the crural sheath, and the other about half an inch above it, formed by the posterior edge of the external oblique muscle, where it is connected with the fascia transversalis.

Posterior edge of
the external
oblique.

The mouth of the hernial sac is the other seat of the stricture.

Mouth of the
hernial sac.

This aperture is very generally small when compared with the size of the hernial sac, and being much pressed upon by the posterior edge of the crural arch it undergoes a slow process of inflammation, which thickens very much the fascia in which it is inclosed. If the sac is removed with the fascia which incloses it, its mouth will be found to form a dense and compact substance, which firmly resists any attempt to dilate it by pressure.

The anterior edge of the crural arch, or Poupart's ligament, does not form the stricture, or require any division, except perhaps in very large herniæ.

The possibility of crural hernia being the cause of symptoms of strangulation, renders it even more than in inguinal hernia necessary for a physician called in on account of symptoms of ileus, to inquire whether there is any tumour in the groin, or the upper part of the thigh, for in crural hernia the tumour is smaller and less prominent than in the inguinal, and more liable to be overlooked. These tumours are sometimes so small that it is not without hesitation that the surgeon determines with respect to the operation; for they are, when small, generally covered with an absorbent gland, and with so much difficulty distinguished, that I confess I have more than once began the operation with much doubt about the nature of the tumour, making it rather the means of determining with certainty, than being assured that it was the disease which I suspected. I have already given two examples, one of the disease being overlooked, and the other of its being mistaken. Those who doubt the possibility of their being thus deceived, ought to read a case published by Mr. Else, in the *Medical Observations and Enquiries*, Vol. X. p. 355. It may be also here observed, that the patient is sometimes unacquainted with the existence of the disease, and often entirely unsuspecting of its being the cause of the symptoms.

Small size of the
tumour.

The treatment which this hernia requires when strangulated, differs but little from that of the inguinal: the mode of using the taxis is, as I have explained in a former chapter, different, but still the same general treatment is to be pursued, such as bleeding, opium internally, the warm bath, topical applications of cold, and tobacco clysters; but as far as my observation extends, these means are less frequently effectual here than in the inguinal hernia, which is probably owing to two causes, viz. to the nature of the parts through which the hernia descends, and the smallness of the aperture forming the mouth of the sac. In the inguinal hernia the parts are so connected with muscles, that any relaxation brought on in these, affects the aperture through which the hernia descends; but in the crural hernia the seat of the stricture is in parts less connected with the action of muscles, and general relaxation has but little effect on them. To this cause then, and to the smaller size of the aperture through which the crural hernia descends, may be attributed the more frequent failures of the means employed for reduction. Cold, by acting on the contents of the hernial tumour, may have as much effect in diminishing its volume as in the inguinal kind.

The treatment.

I attended with Mr. Newington a patient named Jacob Stokes, who had some time laboured under a reducible femoral hernia, which from some violent exertion became strangulated. Mr. N. ordered cloths dipped in cold water to be constantly applied over the tumour, and in five hours it was easily reduced.

When speaking of inguinal hernia I alluded to the danger attending the employment of great force in the attempts at reduction; in the femoral species the caution is equally necessary. A pregnant woman was brought into the hospital, whose hernia was strangulated, but the symptoms were not urgent. So much force was used in the reduction, that she shortly after miscarried, and died of peritoneal inflammation.

The delay of the operation, which I lamented and condemned in inguinal hernia, is to be still more deprecated in the crural; for death very generally happens earlier in the latter disease than in the former, from the causes which I have stated above.

Danger of delay.

Case.

A female servant to Mr. Hervey, Coppersmith, in Houndsditch, aged forty-one years, who had long had a crural hernia on the left side, and who had been employed in her usual manner all the day, was at half past eight o'clock in the evening of Tuesday the 6th of January 1807, seized with symptoms of strangulated hernia. She vomited almost incessantly; her countenance was sunken, and pain excessive both in the tumour and in the stomach. Mr. Robinson, surgeon, in Mansell Street, Goodman's Fields, was sent for on Wednesday morning, who employed the means usually had recourse to in these cases, but nothing afforded her any relief; but seeing her danger, he promised to call early in the evening. At four o'clock in the afternoon she became very feeble, being unable to speak, but still the vomiting continued, and she died at six o'clock, having lived only twenty-one hours and a half after the accession of the symptoms.

The event of this case was certainly unusually rapid; but I have twice known the operation performed only forty hours after the accession of the symptoms of strangulation, and the parts so much altered as not to be in a fit state to be returned into the cavity of the abdomen. This rapid progress to mortification arises from the small size of the hernia, and the narrowness of the aperture through which the intestine protrudes, so that a very great degree of compression is accumulated upon a small portion of the intestine. I should, however, observe, on the other hand, that I have known the operation successfully performed eight days after the accession of the symptoms of strangulation, as will be seen in the following case. But in this case there was a large hernia, and a large quantity of omentum protruded along with the intestine, which formed a kind of cushion around it, and prevented the pressure upon it from being so complete as if the hernia had consisted solely of intestine.

Case.

Mrs. Sheffield, a patient of Mr. Weston, Surgeon, in Shoreditch, had long laboured under a large crural hernia, which became strangulated on the 28th of November 1804. The symptoms had continued for seven days, but did not appear sufficiently urgent to justify an operation; but on the eighth day the vomiting becoming more frequent, and the pain very severe, I was sent for at eleven o'clock at night, and finding the hernia large and irreducible, I immediately proceeded to the operation.

I first made an incision downwards at right angles with the crural arch, beginning opposite the middle of the upper part of the tumour and extending it to its fundus, and another at right angles with the first in the direction of the longer axis of the tumour, so that the united incisions were of the form of the letter T reversed.

This exposed a portion of the tumour which had projected through a hole in the superficial fascia of the thigh, and which had been burst by the pressure of the hernial swelling. I next opened the anterior part of the sac and exposed a large portion of omentum, behind which was placed a fold of intestine much less discoloured than I have seen it in other cases in forty hours after the commencement of strangulation. Next passing my finger into the sac I found that it was divided into two cavities; the anterior was separated from the posterior part by a sort of hour-glass contraction, which was formed by the aperture in the superficial fascia. I therefore passed a director into this opening, and divided the superficial fascia upwards, and afterwards did the same below; the hernial sac was next completely opened below the crural arch. Passing my finger into the hernial sac to its orifice at the crural sheath, I divided the sheath upwards, and then pressing upon the intestine attempted to return it into the abdomen, but found that it would not pass. I again introduced my finger and felt the posterior edge of the crural arch pressing upon the mouth of the sac. The probe-pointed bistoury I have recommended was carried upon my finger under this edge and within the sac, and this portion of tendon cut obliquely inwards and upwards. The intestine was next drawn down to examine if it had suffered much at the strictured part, and finding that it had not, it was returned into the cavity of the abdomen, having first gently pressed upon it to evacuate its contents into the portion of the intestine above the stricture.*

As the omentum, of which a large portion had descended, adhered to the inner part of the sac, I cut it away, and it was found by Mr. Weston to weigh two ounces and six drachms. I made pressure on the vessel, and left the divided surface of the omentum at the orifice of the hernial sac, after which the edges of the wound were brought together by adhesive plaster. On the following day she was free from pain, the vomiting had ceased, and she had two stools. Her recovery, however, was rendered slow by a portion of the integument, which had been extremely thin over the sac prior to the operation, having turned livid and sloughed away. A poultice was applied, healthy granulations arose from the surface of the omentum, and the cure was completed in six weeks.

Mortification.

When the parts have proceeded to mortification, the skin over the tumour is red and very painful to the touch, and it is in some degree an indication of a state of intestine very unfavourable to the success of the operation. However, I may observe, that in a large hernia, where the covering of the sac is very thin, I have known the skin become red and œdematous, yet the hernia was returned by the taxis, and the patient recovered.

Artificial anus.

If the intestine mortifies, and the parts covering the hernia become inflamed and proceed to slough, the intestine will also separate, and an artificial anus will follow. And sometimes the fæces will, after a time, resume their natural course, the wound will heal, and the patient be completely restored. See Cases, Chap. 2, Part 1st.

Of the Operation for Crural Hernia.

Situation of the patient.

The patient is to be placed upon a table three feet six inches in height, the body lying in a horizontal posture, but with the shoulders a little elevated; the legs as high as the knees, hanging over the edge of the

* It is of great consequence both to draw it down and to press out its contents, as it exposes that part of the intestine which had been girt by the stricture, and assists in restoring the course of the fæces through the intestine.

table; and the thighs a little bent, in order to relax the abdominal muscles. The bladder should be emptied, and the diseased side shaved.

The incision is to be begun an inch and a half above the crural arch, in a line with the middle of the tumour, and extended downward to the centre of the tumour below the arch. A second incision nearly at right angles with the other is next made, beginning from the middle of the inner side of the tumour and extending it across to the outer side; so that the form of this double incision will be that of the letter T reversed. The advantage of this form of the incision is, that it gives an opportunity both of examining the parts distinctly, and of turning them aside to give a view of the orifice by which the hernia has descended, and of the parts which form the external portion of the stricture.

For want of this precaution I have known great difficulties occur in the operation, the incision, when single, being too small to give a sufficient view of the parts, and the depth at which the hernia is situated not allowing the surgeon to have a distinct view of the progress of the operation.

The longitudinal incision sometimes occasions a slight bleeding from the division of the external pudendal artery, and it is better to secure the vessel before any thing farther is done.

The first incision exposes the superficial fascia, which is given off by the external oblique muscle, and which covers the anterior part of the hernial sac; but if the patient is thin, and the hernia has not been long formed, this fascia escapes observation, as it is then slight and delicate, and adheres closely to the inner side of the skin.

When this fascia is divided, the tumour is so far exposed that the circumscribed form of the hernia may be distinctly seen, and a person not well acquainted with the anatomy of the parts would readily suppose that the sac itself was now laid bare. This, however, is not the case, for it is still enveloped by a membrane, which is the fascia that the hernial sac pushes before it as it passes through the inner side of the crural sheath. This membrane, the fascia propria, is to be next divided longitudinally from the neck to the fundus of the sac; and if the subject is fat, an adipose membrane lies between it and the sac, from which it may be distinguished by seeing the cellular membrane passing from its inner side to the surface of the sac. This is, in my opinion, the most difficult part of the operation, for the fascia propria is very liable to be mistaken for the sac itself; and another circumstance favouring this erroneous opinion is the fat that lies between the fascia propria and the true hernial sac; this is not unfrequently mistaken for omentum adhering to the subjacent structure, which is thought to be intestine; thus the operator, impressed with the idea of having opened the sac when he has divided the fascia propria, is confirmed in his error by the resemblance which the fatty structure covering the sac bears to omentum;* so that when the fascia propria is divided, it is supposed that the sac is exposed and the intestine is laid bare; following up this idea, the stricture is divided in the outer part of the sac, and the intestine, still strangulated, is pushed with the unopened sac into the cavity of the abdomen. I have given a plate, from an excellent preparation now in my possession, of an undivided sac returned into the cavity of the abdomen, and containing the strangulated intestine, and the particulars of the disease at the end of this part of the subject.† The two following cases illustrate the importance of correctly distinguishing the nature of the covering.

* I lately dissected a femoral hernia that was found in a subject brought into our dissecting room, in which this fatty structure between the hernial sac and fascia propria bears a striking resemblance to omentum; and as a good illustration of this important feature in the anatomy of femoral hernia, I have placed it in the Museum at Guy's Hospital.—Ed.

† The mistake of returning a hernial sac unopened now rarely occurs, since our author has so particularly directed the attention of surgeons to the additional covering afforded by the fascia propria. In the following case this accident had well nigh happened, but that the operator, unable to return what he conceived to be intestine, discovered his error: but after he had opened the sac and removed a portion of the omentum, instead of returning the intestine into the abdominal cavity, he forced it up between the peritoneal sac and sheath of the vessels. The particulars are related by a gentleman who was present at the operation.

Strangulated Femoral Hernia.

Susannah Towers, aged seventy, has had no stool since last Monday, August 20th, 1817, but perceived no swelling till Thursday, the 21st. She is positive that she has taken no violent exercise or made use of any particular exertion. At ten o'clock p. m. she is labouring under evident symptoms of strangulation; her pulse 70, and small and wiry. She has had frequent vomitings to-day, and says that they have been constant since Monday; her extremities cold, and she is in a great state of debility; does not suffer much acute pain, except nippings of the bowels as she expressed it. The hernia was evidently femoral; it was hard and about the size of a walnut with its green shell on; I thought it to contain mostly gut from its unyielding feel, which I thought might be owing to it being full of feculent matter. I took away 6 oz. of blood, but could get no more as she was very feeble. The taxis was applied before and after the bleeding without any advantage. About eleven a surgeon proposed the operation, as he thought all other means of but little use, and that no time was to be lost. A crucial incision was made in the skin and through the coverings of the hernia, except the peritoneal sac which was thought to be intestine. The stricture formed by Poupart's ligament was divided, and he pushed his finger into what he said was the cavity of the abdomen, and requested me to pass up my finger which I did, but it did not meet with the room I expected to find, as I could not readily move my finger about. He endeavoured to reduce the hernia, but in vain; and on closer examination he found that the peritoneal sac was not opened: with some little difficulty he made an opening into it, and having passed in the director, divided it freely with the blunt-pointed bistoury. There was no fluid in the sac; the fore and principal part of the hernia was found to be omentum, and behind it was the intestine about the size of a chesnut of a dark red colour, nearly approaching to the colour of venous blood, but it had not lost its transparent appearance. As the stricture had been divided externally to the sac, there was supposed to be no occasion to divide the sac, nor was the intestine drawn down to be looked at, but it was readily returned, as the surgeon said, into the abdomen. The omentum being quite cold, as was also the intestine, and the blood not flowing in its vessels when emptied a portion of it was cut off, and the rest left at the mouth of the hernial sac. There were some slight adhesions of the intestine to the sac, but they did not seem of

Case.

Mrs. Dearle, aged fifty-nine, a patient of Mr. Evans, in Old Street, had been afflicted with a crural hernia on the left side for twenty years. On Monday, March 31, 1806, she had symptoms of strangulation, which continued till Thursday, April 3, at two o'clock, when I performed the operation.

As the swelling was of considerable length in the direction of the crural arch, I made my first incision over the middle of the tumour in the direction of the anterior edge of the arch, without making any cut at right angles with it, and cutting through the aponeurotic expansion of the external oblique muscle, I laid bare the fascia which immediately involves the hernial sac. Between this and the sac a *number of small vessels could be distinctly seen embedded in a quantity of fat*. This fascia being cut through and the sac exposed, I pinched up a small portion of it between my finger and thumb, and moving the thumb upon the finger I pushed the intestine from that part of the sac, which last I opened by a horizontal incision, and afterwards dilated it upon a director.

The protruded omentum and intestine were thus exposed, neither of which were in so material a degree discoloured as to render the propriety of returning them into the abdomen at all doubtful; and, therefore, I passed my probe-pointed bistoury into the mouth of the hernial sac, and cut directly upwards towards the crural arch. A very small dilatation of the stricture was required, and the intestine returned without difficulty by slight pressure.

The omentum being hard and adherent, I cut away all that had descended, compressed for a few minutes the small vessels which were bleeding till the hæmorrhage was stopped, after which I returned it into the cavity of the abdomen. Three sutures were made on the external wound, and lint was laid over it. She had several stools in the course of the evening, had no bad symptoms afterwards, and in a fortnight the wound was perfectly healed.

Case.

A. B. had a crural hernia in the right side, which became strangulated at nine o'clock in the morning, which she attributed to having taken some bacon and potatoes for her supper the night before.

On the fourth day of the symptoms the following operation was performed. The incision was made to the fascial covering of the hernial sac, it was separated by the finger from the surrounding parts, and a cut being made into it, the hernial sac was supposed to have been opened, and the intestine exposed; but, as it afterwards appeared by dissection, the sac remained undivided. The crural arch being next freely cut, the sac containing the intestine was pushed into the cavity of the abdomen with much difficulty; and its fascial covering was also passed through the same aperture.

Fifth day—She has had no stool since the operation; the vomiting continues; the abdomen is tense, and sore upon pressure. She was ordered to be fomented, and clysters were prescribed to be frequently injected; but no medicines to be given whilst the irritable state of the stomach continued. In the evening a blister was ordered to the abdomen.

Sixth day—She has had no stool; the vomiting continues; the pulse is small and frequent; the belly tense and tender to the touch.

Seventh day—I was requested to see her by the surgeon who performed the operation. I found her countenance flushed; her lips parched; her tongue covered with a brown fur; her eyes sunk, and opening with difficulty, and her countenance highly anxious. She was scarcely able to speak, but her mind was still collected; the pulse was small, fluttering, and frequent: she has had no stool; the abdomen was tense, and tender upon pressure; the vomiting continued, and she had a frequent hiccough. She drank frequently; but every liquid was soon rejected.

The fomentations were ordered to be continued, and a stimulant clyster to be injected.

Eighth day—She still has had no stool, and the vomiting continued; the tension and soreness of the belly remain: she did not suffer so much pain; but she was much weaker. She died at three o'clock in the afternoon.

Dissection of.

Upon cutting through the integuments at the groin, the sac and its covering were entirely gone from thence; but behind the crural arch appeared a large aperture, by which they had been returned into the abdomen. The cavity of the abdomen was next opened, and as soon as a small incision was made into it, the intestines, which were much inflated, pushed through the opening. They were reddened

any importance. The corners of the incision were brought together by a single stitch, and a piece of simple dressing applied. A poultice was ordered, but by mistake not put on. A hot flannel was applied to her abdomen as she complained of some slight pain round the region of the pubis.

August 24th. At a quarter to one an enema of gruel and infus. senn. was thrown up, but it returned again immediately; this was repeated about half an hour afterwards, but with no better effect. Towards half past two she took oz. ss. ol: ricini, but it was thrown up as she has been retching constantly since half past twelve. At half past three the ol: ricini was repeated, and her stomach began to be more composed, but she vomited soon after. At half past four she seemed much better; the vomiting was subsiding, and her pulse now 84 began to get soft and full. I now left her, and did not see her till near eleven o'clock. She had not vomited since I left her till just after ten o'clock, when she threw up much greenish coloured feculent matter. Her pulse is now 96, small and feeble; her tongue furred with a thick brown fur; her countenance betrays much anxiety. The abdomen is quite soft, and only tender towards the lower part. Cal. gr. v. op. gr. i. were then given, but she vomited soon after and it was probably thrown up. Enemas were thrown up between this and one o'clock p. m. when the surgeon saw her and ordered an effervescing draught, suc. lim. oz. ss. sulph. mag. drachms ss. potass. carb. 1 scruple, every half hour, and cal. 3 gr. rhei 2 gr. to be taken as occasion might require; one dose was taken at two. At three I threw up the enema commune; and as there was a prolapsus ani returned it before the injection, and put a compress against the gut. Four o'clock: no vomiting since the saline medicine began to be taken; no stools; pulse 90. At six I saw her again; pulse 90 and weak; extremities cold; soon after taking the cal. et rhei. at this time she retched violently. I threw up another half pint of injection, but it returned almost immediately. At eleven o'clock I saw her again, and she was in articulo mortis; pulse hardly to be felt; coldness and dyspnœa. At a quarter after twelve she died.

Examination thirteen and a half hours after death.—On opening the abdomen the intestines were found slightly inflamed and full of flatus; and feculent matter and flatus above the strictured portion of intestine, but not below it; they were contracted and very small; the intestine was found very firmly girt by the mouth of the peritoneal sac, which still formed a stricture, as the stricture formed by the crural arch had been freely divided externally to the sac; on looking into the sac from the wound in the thigh no intestine was at first perceived, but the surrounding parts being all taken out and more perfectly examined, it was found pushed up between the peritoneum and the sheath of the femoral vessels; here it remained and of course the symptoms continued. I do not think its appearance was altered from when I saw it at the operation. I cannot say whether it had feculent matter in it, as the intestine was pressed and feces pushed into it till it burst; it firmly adhered to the mouth of the peritoneal sac, and these adhesions could not have formed since the operation. Seeing the situation of the hernia, I have little doubt but that it was between the peritoneum and the sheath into which the finger was passed, and which would therefore account for the difficulty of moving my finger about.

Mr. Lawrence relates a somewhat similar case which came under his own observation. The operator returned the hernial sac with its contents without having divided the neck of the sac. It appeared to have been doubled upon itself between the abdominal muscles and peritoneum; this singular manœuvre being facilitated by the operator having divided the lower pillar of the abdominal ring.—*p. 428, Op. Cit.*—Ed.

by inflammation; adhered to each other by their sides, and anteriorly to the peritoneum which lines the abdomen; but the coagulable lymph, which thus united them, was of very tender texture, and when they were separated, red lines, extending along the intestine, marked the adhering surfaces. Looking at the right groin, from within the abdomen, the peritoneum was seen pushed upwards, to the extent of two inches on the iliacus internus muscle; and, upon examining this part, I found the hernial sac included in its fascial covering, and containing the intestine strangulated by a stricture at the mouth of the sac, and by the fascia covering it.

I have preserved the parts as I found them in the subject, and have given a plate of them as they appeared on dissection.

This case strongly points out the necessity of being acquainted with the existence of the fascia propria.

It must be remembered, however, that in very large herniæ the fascia propria is sometimes inseparably united to the superficial fascia, so that the same incision divides both.

The hernial sac being exposed is to be next opened; and to divide it with safety, it is best to pinch up a small part of it between the finger and thumb, to move the thumb upon the finger by which the intestine is distinctly felt, and may be separated from the inner side of the sac; and then to cut into the sac, by carrying the blade of the knife horizontally. Into this opening a director should be passed, and the sac, if small, opened from its fundus to the crural sheath. A small quantity of serum usually escapes when the sac is opened, which is either transparent or sanious according to the length of time that the strangulation has continued. The intestine or omentum, or both, then become exposed.

Hernial sac opened.

It often happens, however, that there is no fluid contained in the sac of femoral hernia, even although no adhesion exists between the sac and its contents; a circumstance which probably may be attributed to the small size of the sac and its contents, and the very limited secreting surface which it affords, for when there is much unadhering intestine, there is always a notable quantity of serum. If the strangulation has continued for many hours, the intestine is also covered with a coating of coagulable lymph, but not otherwise.

Fluid in the sac.

The next part of the operation consists in the division of the stricture; for this purpose the finger is to be introduced gently into the sac, and the omentum and intestine separated from its anterior part, the probe-pointed bistoury which I have recommended, which does not cut near its point,* is to be pushed into the crural sheath at the anterior part of the sac, and the sheath is to be cut as far as the anterior edge of the crural arch, or Poupart's ligament. In a small hernia this division, which does not exceed half an inch, will be sufficient for the reduction of the parts. This was all that was done in the following case, and the intestine was easily returned by this incision.

First stricture divided.

Miss ———, aged nineteen, a patient of Messrs. Shutters', of Gainsford Street, Horslydown, on Saturday, April 19, 1806, was seized with violent pain in her stomach, a painful tumour appeared in the left groin, and she attributed these symptoms to her having used a degree of bodily exertion to which she was not accustomed.

Case.

She immediately sent for Mr. Shuter, who gave her an opening medicine, which her stomach was unable to retain. Clysters were also administered, which produced some evacuation, but without affecting the size of the tumour. Frequent attempts were made to return the hernia; but though the swelling appeared to lessen, and she expressed herself somewhat easier after each attempt, the symptoms returned with all their former violence. Fomentations were tried, but they only gave a temporary relief.

On Sunday morning, April 20, the vomiting, costiveness, and tumour still continuing, Mr. Shuter gave her a dose of opium, and came for me.

When I saw her, which was about half past ten o'clock, the pain was somewhat relieved by the opium; but she was still sick, the tumour painfully tense, and the whole abdomen becoming tender.

Having made an unsuccessful trial at reduction, and finding that an immediate operation was now the only chance for preserving life, I performed it at eleven o'clock.

My first incision through the integuments was in the form of an inverted T, and the corners of the skin were turned back. Then dividing the aponeurosis of the external oblique muscle by a second incision, the fascia propria of the sac by a third, and the sac itself by a fourth, the last of which was assisted by a director, in the way already described, the contents of the hernia came in view. On opening the sac a small quantity of fluid was discharged, and after this a clot of coagulable lymph was squeezed from its inner part. The intestine was of a brownish red colour. Passing my finger into the sac, I carried it to the stricture, but could not enter it; I then introduced the knife blunted near the end, rubbed it from side to side to press every portion of intestine away from its blunt edge, and then pushing it forwards brought its cutting edge against the stricture which was in the crural sheath, and divided it upwards. The intestine then returned into the abdomen on gentle pressure, though the division which the knife had made was so small, that I could not pass my finger through it into the abdomen. The wound was then sewed in the usual manner.

Monday 20, she was much better; no vomiting had occurred after the operation, and the pain soon ceased, but she had no stool till this morning, which, when it occurred, entirely relieved the general irritation which the operation had occasioned.

Wednesday, she was quite free from pain, and in every respect doing well. She was ordered to keep her bed, as I much wished the omentum at the orifice of the sac to adhere. The ligature came away in ten days, and in three weeks the wound was healed. A truss was applied before the cure was completed, with the hope that this would produce adhesion of the sides of the sac whilst the process of inflammation was proceeding.

* I have used this instrument for several years, and can now recommend it still more strongly than formerly, on account of its safety in not injuring the intestine within the abdomen.

Second stricture.

But when the sheath has been thus divided, if the intestine, when slightly compressed, cannot readily be emptied, the finger must be passed at least half an inch higher, and then the posterior edge of the crural arch and the fascia transversalis will be felt, forming a sharp edge, strongly compressing the mouth of the hernial sac. To divide this edge the knife must be carried within the stricture, and being inclined obliquely inwards and upwards at right angles with the crural arch, a cut may be very safely made in that direction sufficient for the purpose of liberating the intestine from pressure.

Third stricture.

The two incisions which I have directed being made from the interior of the sac, any stricture arising from the contraction of the sac itself will be at the same time removed, and the protruded parts be thus completely liberated.

If the hernia is large and any pressure has been made on its contents by the falciform edge of the fascia lata, the first incision will divide that edge.

No considerable pressure made after the division of the first stricture.

Much danger will arise from any forcible attempt to press the intestine into the abdomen after the dilatation of the opening of the crural sheath; for if the stricture is at the second part, viz. at the posterior edge of the crural arch, this makes so firm a pressure on the parts, that the intestine will rather give way than the stricture will yield, and I am induced to believe, that this seat of the stricture has not been generally understood: yet in several of the cases in which I have operated, it has been situated there. Mr. John Pearson, also informed me that he lately operated upon a crural hernia, and divided all the parts which he could at first feel forming the stricture; but still an impediment existed to the return of the protruded parts, and he was obliged to divide the stricture much higher up before he could return them.

Circumstances to be attended to in dividing the stricture.

Surgeons talk very carelessly upon the subject of dividing the stricture; they say that the finger must be put into the sac, and wherever the stricture is felt that it should be divided. Again, it is said, the stricture is situated on the inner side of the sac, and derived from the pressure of the insertion of the tendon of the external oblique, or what they call Gimbernats's ligament. They do not consider that a stricture is a circle produced in the same way as if a cord were tied round the protruded parts, and that the division might be made at any part excepting the posterior, where the bone is placed, if other circumstances did not prevent it. The stricture may be divided on the inner side of the sac, that is, towards the pubes; but to this there are strong objections, which I make the subject of a future chapter. It cannot be divided directly outwards, for there the crural vein must necessarily be injured, and if the division is made upwards and outwards, towards the spinous process of the ilium, the epigastric artery is much endangered. However this artery is not so liable to be cut in the crural hernia as has been imagined; for it does not approach nearer than half an inch of the upper and outer part of the sac, and an incision of half an inch is more than is usually required to liberate the protruded parts in crural hernia. The stricture may be safely divided upwards, but the mode of doing it, in which there is the greatest security, both as respects the blood vessels and the protruded intestine, is to pass the bistoury into the middle and anterior part of the mouth of the hernial sac, and to cut the stricture upwards, and with a slight obliquity inwards towards the umbilicus.

Crural vein.

Epigastric artery.

Division upwards.

The late Mr. Hey, whose name should be never mentioned but with respect, who was not contented with the mere practice of his profession, but who studied to improve it, advised that the knife should be introduced on the inner side of the sac, and the division be made directly upwards.*

Large herniæ.

Spermatic cord how avoided.

In the female, if the hernia is large, it will be sometimes, though very rarely, necessary to cut through the anterior edge of the crural arch, or Poupart's ligament, and this may be done from the inner side of the hernial sac by cutting obliquely upwards toward the umbilicus. But in a large hernia in the male subject, when the division of the crural arch is required, a different operation becomes necessary to prevent the spermatic cord from being

* In the anatomical description of these parts, in the first part of this work, I have pointed out what appears to be the usual seat of stricture in strangulation of a femoral rupture, namely, a tendinous band which joins the fascia transversalis to the posterior margin of Poupart's ligament, and which is quite distinct from Gimbernats's ligament, upon which so much stress is laid by some as constituting the stricture. The difficulty which I have witnessed in relieving the stricture when the operator has divided Gimbernats's ligament towards the pubes, and the necessity of repeatedly introducing the bistoury, give a decided superiority to the upward division of the stricture, which mode of division includes the tendinous band alluded to. Dr. Breschet describes M. Dupuytren's mode of operating as coinciding with our author's as to the parts divided; but he gives a somewhat different direction to his knife, which is convex on the edge, and carried obliquely outwards. This mode of dividing the stricture he has long practised, both in the male and female subject, without any hæmorrhages. This experienced surgeon concurs with our author and the late Mr. Hey, in the opinion, that a very slight incision of the stricture is sufficient to release the intestine; a practice that removes the fears a surgeon may otherwise entertain of wounding the spermatic vessels or the obturator artery, when that vessel arises from the epigastric, which by an extensive incision might be endangered.

In reducing a strangulated femoral hernia by the taxis, I would observe that it is of use to bear in mind the situation of the aperture through which the prolapsed parts have to pass. When the hernia has acquired considerable size, the opening is not situated opposite to the centre of the tumour, but somewhat to its inner side; that is, the tumour as it increases dilates towards the ilium. When a fresh descent takes place, which is the usual cause of strangulation, the newly descended portion of gut will be found at the inner part of the tumour, and should be the part the surgeon first endeavours to replace; for this purpose a counter pressure should be made on the outer part of the tumour, while he kneads the inner portion as it were into the thigh. This plan I have found succeed, when indiscriminate pressure on the whole tumour has failed to reduce it.—Ed.

injured. When the parts have been laid bare, and are found to be too large to be liberated by the division of the sheath and posterior edge of the crural arch, an incision should be made through the tendon of the external oblique muscle over the mouth of the hernial sac, about a quarter of an inch above the crural arch, which will expose the spermatic cord. This being drawn up by the finger, or by a curved probe, and removed from the direction of the incision, the surgeon carries his finger into the sac with the bistoury upon it, and the anterior edge of the crural arch is cut without the smallest risk to the spermatic cord. See plate relative to the operation, where a view is given of the parts in which this operation has been performed, as it was in the following case.

Joseph Falbrook was admitted into Guy's Hospital, Nov. 4, 1805, for a crural hernia on the left side, with which he had been afflicted for some years. He had before been a patient in the hospital for a strangulated state of the same hernia, but the taxis had then succeeded. Case.

The hernia had now been strangulated about forty hours, and the symptoms were more than commonly urgent. The vomiting was frequent, the constipation complete, and hiccough had existed for several hours; his countenance was pale, sunken, and anxious; and, above all, the abdomen was sore and tender to the touch.

The usual means of reduction having failed, though the taxis was employed for a considerable time, it was judged that the violence of the symptoms rendered the further delay of the operation very hazardous; and even then I thought it very probable that it might not save his life; but as it afforded the only chance for his preservation, and as I have seen persons recover who appeared to be dying at the time of the operation, it was thought right to perform it. The tumour had no appearance of inflammation on its surface, it moved to and fro under the skin like an enlarged absorbent gland, and was turned before the crural arch.

I made my first incision in the form of an inverted T, as already described, and after cutting through the fasciæ the hernial sac was opened, when a very small quantity of fluid made its escape; and on slitting up the sac, a portion of strangulated and highly discoloured intestine became exposed. As this portion of intestine was large, I could not make sufficient room for its return, without dividing the anterior edge of the crural arch, or Poupart's ligament; and being apprehensive of injuring the spermatic cord, I first made a small incision about half an inch above the arch to expose the cord, and then directing my dresser to draw this upwards with his finger, I passed the bistoury within the mouth of the hernial sac, and divided it and the arch with the greatest ease.

Although the intestine was much discoloured, no livid spots appeared upon it, and I therefore returned it into the cavity of the abdomen, but I expressed my fears to the students at the time, that the operation had been delayed too long.

On the following day I found that the operation had so far relieved him, that his pain was much less than before; but he still vomited, and his bowels were constipated, which made me apprehend that the intestine had been too far altered to recover its powers.

On the succeeding day he was still alive, but his pulse was feeble, his countenance sunken, his body covered with a cold sweat, and his abdomen very much distended. He died on the following morning.

My house pupil, Mr. Jones, examined the body, and found the intestines highly inflamed; and he brought away the portion which had been strangulated, as well as the crural arch and the adjacent parts, of which I have given a plate. The intestine which had been strangulated remained in the same state as at the time of the operation.

Mr. Else proposed that after an incision had been made above the crural arch, a director should be thrust behind it, and the arch divided upon the director to free the strangulated parts. But the reflection of the fascia transversalis renders it impossible, without considerable violence, to force a director thus into the crural sheath, and a friend of mine, Mr. Borrett, Surgeon, at Great Yarmouth, who performed this operation, told me, that he found great difficulty in passing the director under the arch.

In very large femoral herniæ the same objection to opening the sac holds as in inguinal hernia, and for the same reasons I stated in the first part of this work in the chapter on large herniæ. The following case is a good illustration of the impropriety of opening the sac when the contents are so voluminous as to render it impossible to return them into the abdomen. It was communicated to me by Mr. Dalrymple, of Norwich. Large herniæ.

Early in the afternoon of the 16th of June, 1815, Mary Ducker, aged fifty years, was admitted into the Norfolk and Norwich Hospital with symptoms of strangulated hernia. She said, that between seven and eight o'clock in the morning, whilst engaged in her household work, she felt something suddenly slip down into a large tumour in her groin with which she has been long afflicted: and that she was instantly seized with faintness, severe colicky pains in the belly, with frequent retching and vomiting. Case.

At five o'clock she was visited. Her symptoms were sufficiently specific, though not very urgent. The hernia was on the right side, and of prodigious bulk,—considering the sex of the patient greatly exceeding any I have ever seen. It reached half way down upon the thigh, across which it lay in an oblique direction, occupying nearly the whole space between the anterior superior spinous process of the right ilium and the tuberosity of the ischium. In this direction it measured fifteen and a half inches in length; in the line of its shorter axis, from above downwards, it was eight and a half inches long; and probably capable of containing from three to four pints of fluid.

It first descended about eight years ago; since that time it has been habitual, irreducible, and utterly neglected, no kind of bandage having ever been applied to it.

It was soft, even flaccid, and uniform to the touch; and excepting at its root, where it was extremely sensible, a considerable degree of pressure gave but little pain. The belly is very flat, its cavity being strikingly contracted, in consequence, no doubt, of the long continued absence of so large a proportion of its usual contents.

The diagnostic character of the rupture was not distinct.

The neck of the tumour did not appear to lie *below* the tuberosity of the os pubis, and its breadth was so considerable that it was

more than difficult to say it lay at the *outer* side of that process. When, however, the tumour was forcibly drawn downwards, something like the line of the crural arch might be perceived. This circumstance, combined with the sex of the patient, determined me to consider it as a crural hernia. At seven o'clock in the evening the operation was performed.

A perpendicular incision, about five inches in length, was made through the integuments a little on the inner side of the crural vessels; and crossed, at its termination by a transverse section, in the manner proposed by Mr. Cooper. The advantages of this mode of operating can scarcely be over-rated. The flaps that resulted were carefully dissected from the subjacent fasciæ, which being divided laid bare the herniary sac. This membrane, with much reluctance and regret, I was induced to open freely, and became instantly embarrassed by an unwieldy mass of bowel consisting of nearly a fifth part of the floating contents of the abdomen. The parts recently prolapsed were readily discernible from those which formed the permanent and irreducible hernia. The latter was composed of at least one third of the colon, with the whole of the cœcum and its appendix vermiformis. The colour of these intestines was scarcely, if at all, altered; but their texture was preternaturally firm and fleshy. The newly prolapsed parts consisted of a vast quantity of ileon, and bore slight marks of inflammation. There were no adhesions of the intestines either to their respective convolutions, or to the surface of the herniary sac. The seat of the stricture was at the anterior edge of Poupart's ligament; it was freely dilated upon the fore finger of the left hand in a direction upwards and downwards. Gimbernat's ligament, distinctly perceptible to the touch, afforded no effective resistance; but the diminished capacity of the abdominal cavity rendered it impracticable to reduce and retain the prolapsed intestines. They were, therefore, carefully replaced within the herniary sac, the edges of which were brought together by sutures, cohesive strappings and the usual bandage. No vessel of consequence was opened, nor did any untoward accident occur during the operation. No mitigation of the symptoms followed; on the contrary, in a few hours they had acquired great additional force, and in spite of very active treatment proved fatal on the morning of the 19th of June, about seventy-two hours from the commencement of the symptoms, and sixty hours from the performance of the operation.

Dissection.—The body was opened twelve hours after death by a careful dissection of the abdominal muscles of the right side, and of the integuments of the herniary sac and upper part of the thigh, as if for a demonstration of the parts concerned in femoral hernia. This proceeding shewed the root of the tumour lying in the usual situation of crural hernia, the crural arch being distinctly seen passing over it; the external abdominal ring lying at its inner side and a little above it. The wound made into the sac by the operation was reopened and extended, and shewed its contents lying nearly in the same situation as when they were first exposed; their appearance, however, was greatly changed. The whole of the prolapsed intestines were highly coloured by inflammation; their convolutions were glued together by extensive effusions of coagulable lymph, and the inner surface of the sac was universally adhering to the peritoneal surface of the bowels by the same connecting medium. Its texture was very tender, and the parts thus united were easily separated. Small insulated masses of coagulable lymph were also found deposited upon the intestines in different parts of the sac. The peritoneal surface of the intestines that remained within the belly, exhibited in places slight marks of inflammation, but there was neither effusion of blood, or of any other fluid perceptible within the abdominal cavity.

Under such circumstances it would be advisable to divide the stricture without opening the sac, and by gentle pressure on the sac to return a portion of its contents. If these measures failed, the operator might then make a small opening in the upper part of the sac, and divide its neck with the bistoury.

Small herniæ.

When the hernia is small the practice of not opening the sac becomes objectionable, on account of the risk of gangrene ensuing in the coats of the intestine. The aperture in the femoral rupture is so narrow, that long continued pressure is more likely to be attended with fatal consequences to the intestine than in the inguinal species; and whenever, from tenderness of the tumour and other symptoms, there is the least suspicion of the coats of the intestine being injured from the strangulation, the sac should invariably be opened and its condition ascertained. This affords the only hope of saving the patient, should the intestine slough. The following observation is instructive.

Case.

John Bishop, a healthy hard-working man in the fifty-fifth year of his age, had been the subject of a reducible femoral hernia of moderate size on the right side for several years. On the morning of the 19th of October it became (from over exertion) strangulated; and continuing to resist the effects of the taxis, he was brought into Saint Thomas's Hospital at about ten o'clock on the morning of the 22nd, four days subsequent to the commencement of the strangulation.

During this period he had frequently vomited, and no alvine evacuations had been procured by repeated clysters and cathartics. The taxis, under the usual circumstances of the warm bath, venesection, and tobacco clysters having failed of success, the operation was performed at about one o'clock by the surgeon, who, from the excessive irritability of the part, when he first saw the patient, did not attempt reduction.

An incision was made through the integuments nearly perpendicular to the crural arch, and about two inches in length, partially exposing the tumour; to do this completely, a second incision at right angles with the first, and an inch in length, was made towards the scrotum. The loose fascia and cellular substance being cleared away, brought to view a suppurating lymphatic gland, under which was a small hernial sac tense and unyielding. The fascia lata was plainly seen below, and the crural arch above it. With the point of the finger a stricture was found at Poupart's ligament, the fibres of which were divided directly upwards. Gentle pressure was now made to return the contents, but failed in consequence of a very rigid stricture made by the arched fibres of the fascia transversalis beneath Poupart's ligament; this was divided by a probe-pointed bistoury, and the contents returned with a gurgling noise completely into the abdomen. The sac was not opened.

The patient was removed to bed, and directed to take 2 drachms of magn: sulph: in solution every third hour. An enema to be thrown up if the first two or three doses of the solution should produce no effect; grt. 4 of the tinct. of opium to be given every sixth hour, and fomentations to be applied to the abdomen. On visiting him in the evening of the same day, his pulse was quick; he had had

a scanty evacuation from the lower bowels; had vomited frequently, but was free from pain. On the 23rd in the morning, he was reported to have spent a sleepless night; to have vomited continually until breakfast, which meal he retained upon his stomach. Another clyster had been administered about four o'clock, and three small brown evacuations, containing a few scybala, had passed since the operation; his pulse was small and rather thready; the wound and abdomen free from pain on pressure; ordered to repeat the solution every second hour, omitting the tinct. opii. In the afternoon he had a good healthy evacuation, decidedly from the upper bowels.

October 24th. Several copious evacuations since the afternoon of yesterday; and during that time he has only vomited once; quite free from pain, but uneasy, complaining, and restless; pulse 90 and small; tongue clean; ordered calomel 2 gr. omitting saline aperient.

October 25th. Noon: has vomited twice during the morning a considerable quantity of green bilious fluid; he had several loose motions; was very restless during the night; complains of pain in the wound, and over the whole of the abdomen; tongue furred; pulse 90 and full; ordered mist. efferves. 6 tis. horis, with gtt. 4 tinct opii. Two o'clock: pain increased; pulse quicker and harder; respiration oppressed; ordered v. s. ad 16 oz. hirud 20 abdomini. Five o'clock: leeches have sucked badly; the pain still continues though in a slighter degree; v. s. ad 8 oz.; former blood neither cupped nor buffy; pulse 126, small and thready; breathing less laborious.

October 26th: ten o'clock a. m. Has spent a comfortable night, and is free from pain; vomited twice during the morning, and has passed two very fetid evacuations; pulse 94 and feeble; continue mist. efferves. Ten p. m.: pulse 106 and very feeble; moans continually, and complains of pain on pressure of the abdomen; breathing laborious; tongue covered with a deep brown fur; vomits often, and has had several motions; ordered calomel gr. 2, opii gr. ss. He continued to vomit at intervals, having during the whole of the time copious and healthy alvine evacuations, until the evening of the 29th at nine o'clock, when he died.

The following were the appearances on dissection, twelve hours after death.

The small intestines moderately filled with air and soft fluid matter; stomach distended with flatus; peritoneal surface uninflamed, excepting some slight red streaks on the bowels, at the angle of contact between the folds; no effusion of lymph, except around the hernia; a portion of ileum was disorganized, appearing like an ash coloured rag; this part, however, was covered in by a surrounding adhesion of the mouth of the sac, so that it was not seen till the adhesion gave way, when a quantity of pultaceous feculent matter passed into the pelvis. Another fold of intestine adhered to the sound side of this, and supported it against the ring. About one third of the tube of the portion of gut which had been strictured was sound, and plenty of feculent matter had passed through it into the lower part of the canal. The mouth only of the sac was left, the fundus having been removed two evenings prior to the patient's death, to facilitate the escape of the fecal matters, if gangrene (as was suspected) had taken place. On the mouth of the sac a deposition of lymph in form of a lip or border was adhering to the line of separation of the bowel, so that no effusion could have taken place into the abdomen, if an artificial anus had been established, which it probably would have been in twenty-four hours,—judging from the state of the gut, and from an oozing of feculent fluid matter having taken place in the poultices on the day of his death.

Hence it appears the intestine had been returned in a state of high inflammation at the time of the operation, and had subsequently become gangrenous and covered by the surrounding adhesion to the mouth of the sac; and had an artificial anus been formed, before the powers of the patient were exhausted, it is probable his life might have been saved.

The vomiting was obviously relieved by the free alvine evacuations, but the action of the intestine was interrupted at the dead piece, which could have no action, and was therefore a partial obstruction. If the whole cylinder gangrened, the obstruction would have been complete, and instead of living a week, vomiting occasionally, the vomiting would have been incessant, and the man would have died in half the time, provided no artificial anus had formed at the wound;—this would have saved him in either case, because it would have rendered the stomach tranquil. In a similar case, therefore, it would be advisable to make an artificial anus, by opening the dead portion of bowel *in situ*.

If the intestine adheres to the sac, extraordinary caution is required, both in the division of the stricture and in separating the adhesions. It is best to begin with gently separating the adhesions with the finger rather than with the knife, which can generally be effected without doing violence to the parts; but if the adhesions are short and very firm, portions of the sac must be cut away and returned into the abdomen with the intestine to which they adhere; the stricture too must be divided fibre by fibre with extraordinary care.

My friend, Mr. Johnson, of Exeter, severed the adhesions in a case on which he operated, and the intestine recovered its function. He writes to me as follows.

I have lately had occasion to perform the operation for strangulated femoral hernia. It occurred in one of the quarter master's wives of the ninth dragoons, in barracks near Exeter, and fell under the care of Mr. King, assistant Surgeon of the North Hants Militia, by whom I was called in. The strangulation had existed for about thirty-six hours at the time of performing the operation, and the tumour had then become exceedingly tender, with a blush of inflammation over its surface. The small portion of intestine that was down appeared of a very dark colour, and was every where adherent to the inner surface of the peritoneal sac. These adhesions were not so firm but that they admitted of being torn through by making use of the handle of the scalpel. Nothing besides worthy of remark occurred during the operation. The fascia propria was very distinct, and by dissecting it entire from the peritoneal sac, I was able to shew it to every one present, among whom were Mr. Patch, Mr. Adams, and several other professional men of Exeter. The patient recovered without having one bad symptom, and the wound was perfectly healed on the seventeenth day.

In this case I felt myself at a loss to account for the complete remission of the symptoms of strangulation which took place after the administration of the tobacco enema, and which continued for seven hours afterwards, although the tumour remained exactly in the same state. The delusion indeed was such as to induce Mr. Patch, one of our oldest and most intelligent hospital surgeons, to believe that the disease was nothing more than an enlarged gland, accidentally combined with colicky symptoms.

Adhesion of the intestine.

Case.

Two cases have also occurred, since writing the former part of the first edition, of mortification in the intestine, in which, after opening the hernial sac, I left the process of separation to the efforts of nature, applying a poultice only: one of these patients died in two hours, and the other in twenty-one hours.

If after the symptoms of strangulation have continued for some time, and the external parts become mortified, it is best to leave them to slough, without attempting to assist nature by an operation; in proof of which I will again refer the reader to the case in Chapter XI. in the first part of this work, sent me by Mr. Cooper, of Wootton-under-Edge, Gloucestershire.

If, however, the ulceration in the intestine is extensive, and the intestine is the upper part of the ileum or a portion of the jejunum, the powers of the constitution are unable to bear up against the exhaustion produced by the rapid discharge of the aliment at the wound. The following is an instance of an artificial anus established by ulceration of the intestine and integuments, without the operation being performed.

Case.

Martha Williams, aged sixty, was admitted in an emaciated state labouring under sphacelated femoral hernia on the left side. From her account it appeared that she had been subject to a small hernia for ten or twelve years, which was easily reduced either by pressure or the recumbent posture. About fourteen days previous to admission the hernia became irreducible, and slight symptoms of strangulation began; a pain in the abdomen and the tumour followed by sickness and vomiting; the action of the bowels, however, still remaining perfect. The pain in the abdomen, the sickness and vomiting, lasted two or three days and then went off. The tumour became more painful, and then began to inflame and tumify; it continued increasing in size until the fifth day previous to admission, when the integuments having ulcerated the fæces began to take their course through the groin, previous to which she had passed her stools per anum without difficulty. Except the first two or three days, as before mentioned, she had neither sickness, vomiting, nor pain in the abdomen. An ulceration took place, and there was a dark coloured crimson spot as large as a crown piece in the middle of the tumour; and the third day after the ulceration that spot began to sphacelate, in which state it remained at the time of her admission. Her general health had been always good, and she had worked hard at washing, etc. At the time of her admission the tumour was in the following state: it occupied the whole length of Poupart's ligament; an erysipelatous inflammation extended from the parts of generation over the tumour, lower part of the abdomen, top of the thigh, and even round to the loins. On the middle of the tumour was a sphacelated spot at least three inches long and two broad. At the lower part of the tumour, by the side of the pubis and near the line of separation, there was a hole as large as the point of the little finger, through which fæces were discharged. In two or three days after admission another opening was established at the opposite or outer extremity of the tumour through which also the fæces passed, and in a short time the intervening portion of sphacelated integument separated, along its interior margin, from the sound part below, and laid the two holes into one, along the whole length of which the fæces were discharged. Fomentations only were used. All the nourishment she took was porter, wine, etc., which passed through the groin as soon as she had swallowed it. She died in a few days after her admission.

When the intestine is mortified, the treatment which I recommend I need not here repeat, as the principle has been fully explained in the chapter on mortification of the intestine in the first part of the work. The two points which I more particularly insisted upon, as being essential to the success of the operation, are making a free incision into the gangrenous bowel, in order to provide a ready outlet for the accumulated feculent contents. Where this treatment is pursued, before the powers of life are exhausted by the continuance of the disease, I have shewn it to be successful; but when the operation has been so long delayed, that the vital powers cannot rally when the intestine is unloaded, the symptoms continue with little or no abatement until dissolution takes place.

Case.

A man, aged fifty-three, was admitted into Guy's Hospital at four o'clock in the afternoon of May 24, 1804, with a strangulated crural hernia, which had been in that state since the twenty-first; and previous to his admission poultices had been applied to it, under the idea of its being a suppurating bubo. Some attempts had been made to reduce it, but without effect, and at seven in the same evening I performed the operation. The swelling at this time was very obscure, but it bore some resemblance to a suppurating bubo, for the skin over it was inflamed.

When the skin was cut through, which was done by a crucial incision, the fascia was exposed lying over the swelling, and upon this was a quantity of grumous blood very offensive to the smell, and a bloody serum mixed with drops of animal oil. When the fascia was divided, and the sac exposed, it appeared soft and pulpy, and I easily made a small opening into it with my finger nail, which I afterwards enlarged with a knife on a director.

No fluid was found in the sac, but omentum, and intestine had both descended. The former was of a brownish red colour, as if tinged with blood; the intestine, in most parts, was of a coffee colour, but with several black spots, which were evidently mortified. A very offensive smell issued both from the omentum and intestine.

Having examined these parts, I passed a director between the fascia and the sac, and attempted to divide the stricture without opening the sac; but as I still found a stricture at the mouth of the hernial sac, I carried a probe-pointed bistoury within this, and divided the orifice of the sac directly inwards along the linea ileo pectinea.

As the intestine was mortified, I passed a needle and ligature through the mesentery (a practice I have long discontinued), and fixed it to the mouth of the hernial sac, then made a large opening into it, and discharged the fæces. I also left the omentum within the sac, and covered the whole with a poultice. The man appearing in a dying state, he was immediately carried to bed, and in about an hour afterwards I found him in a cold perspiration. As no fæces had passed from the wound in the course of two hours, I dilated the stricture at the orifice of the sac somewhat more freely, and then the fæces rushed down into the mortified intestine and were discharged by the opening in it.

On the next day he still vomited, and his extremities were cold, but his mind was composed, and he was insensible of his danger; his pulse was small, but scarcely quicker than natural; he had no hiccough, nor any pain. At four o'clock in the afternoon he vomited violently, and suddenly expired.

Dissection.—The intestines were all inflamed and glued together within the cavity of the abdomen, and were greatly distended with air and fæces. There was no appearance of mortification in any other part of the intestine than that which had descended into the hernial sac; nor was any other disease found, excepting ossification at the beginning of the aorta.

On December 24, 1806, I was requested by Mr. Smith, at Chertsey, in Surry, to visit Mrs. Webb of that place, who had a crural hernia on the left side, and of whose situation Mr. Smith gave me the following account. On Tuesday the 16th of December, she complained of much pain about the region of the uterus, attended with bearing down, suppression of urine, pain in the back, and a quick pulse. She mentioned that she had been subject to a bearing down pain (her own expression) before, but that this was more violent than ever. Case.

Mr. S. gave her some castor oil, which was soon rejected, and then a solution of magnesia vitriolata, which, although longer retained, was also eventually rejected.

Wednesday—She had vomited during the night, and now, for the first time, complained of a swelling in the groin, which Mr. S. found to be a hernia; after administering a clyster, he made an attempt to reduce it, but in vain. She was thought to vomit feculent matter during this afternoon.

Thursday—Mr. White requested his friends Mr. Ives and Messrs. Tothill, of Staines, to assist him in consultation, as the case was becoming extremely dangerous; and they continued to visit the patient daily until I saw her. During this period, bleeding, the warm bath, opium, clysters, and cathartics were tried, but without avail. Ice, and the solution of ammonia muriata were also used; and on Tuesday the 23d, the tobacco smoke was thrown up.

Wednesday the 24th, I met Mr. Smith, and the gentlemen above mentioned, at the patient's house. The tumour was slightly inflamed, and very tender to the touch. The abdomen but little distended, and not very sore upon pressure; her pulse, however, was quick and very feeble; her countenance anxious; her frame weak and languid, and she had occasional hiccough. It was immediately agreed that the operation gave the only chance of saving her life, although that hope was small.

In performing the operation two incisions were made through the integuments, three inches long, and in the form of the letter T reversed. By the second incision the superficial fascia, which was much thickened, was divided, and the fascia covering the sac was exposed. A small opening being made in this, a director was introduced behind it, and it was divided by the curved bistoury to the crural arch.

The sac was next opened by a very small cut, and afterwards dilated in a similar manner to the fascia.

The omentum was first exposed, which was of a dark colour, and had a feculent smell; behind this, and involved in the posterior part of the omentum, was found a portion of intestine seven inches long, perfectly gangrenous, but there was no opening in it, so that the feculent smell which was observed in the sac, and its contents, was the effect of transudation after the death of the parts. The finger was now passed to the orifice of the hernial sac, and the stricture was found not at the opening in the crural sheath, but much higher up, and could be distinctly felt, formed on the inner side by the interior insertion of the external oblique muscle and the fascia behind it, on the anterior by the posterior edge of the crural arch, and externally by the process of fascia on the inner side of the crural vein.

I passed the probe-pointed bistoury into the sac, and cut the posterior edge of the crural arch upwards, and slightly inwards; and then made an opening into the mortified portion of intestine to discharge the fæces, and left the part to slough.

During the operation her pulse became very feeble, and she was very languid. I saw her about half an hour after she was put to bed, and then she appeared to be sinking; and Mr. Smith wrote to me the following day, to say, that in an hour after I left her, she complained of much pain in her abdomen; was covered with a cold perspiration; her pulse was extremely feeble; she was sensible of her approaching dissolution; said that she should not live more than an hour, and in about that time she died.

It ought to be remarked, that the circumstances usually considered as denoting the presence of mortification, did not occur in this patient, for there never was any sudden change of symptoms, any abatement of pain, or considerable alteration in the state of the pulse. The only circumstance which induced me to expect to find a mortified intestine, was the inflammation and tenderness of the skin over the tumour, and the duration of the symptoms of strangulation.

In the two following cases sutures were employed to bring the edges of the intestine in apposition, but without any effect. It will be observed that these cases occurred before the year 1808, when I entirely laid aside the use of sutures as highly prejudicial under these circumstances, and adopted the mode of treatment described in Chapter XI. of the first part.

—— Clark, aged fifty, was attacked with symptoms of strangulated hernia on the 1st of November, 1806, which she supposed were produced by carrying a great weight upon her head. On the 6th in the evening, my friend Mr. Saunders, Surgeon, knowing my wish to see every example of hernia that I could, informed me of the case, and I found a crural hernia in the right side. She vomited frequently; was completely constipated, and had fits of pain at the interval of a few minutes; but the abdomen, though tense, was not sore upon pressure, and this induced me to hope that the operation might still preserve her life. I staid with her more than an hour, strongly urging her to consent to its being performed, but she refused to submit to it at that time, as she thought herself somewhat better. Case.

On Saturday the 8th, I was sent for to perform the operation, as she was then very anxious to have it done. At this time she had the following symptoms: Obstinate constipation, for she has had no stool for eight days; frequent vomiting of a yellowish fluid, free of feculent smell; abdomen distended, and rather painful when pressed; the tumour red, hard, and exquisitely painful to the touch; her pulse 130 and strong; her tongue furred and dry; great thirst; countenance sunken and distressed.

The operation was performed at one o'clock, in presence of Dr. Farre and Mr. Saunders.

The first incision, which was in the form of the reversed T, exposed the superficial fascia very much thickened, and this being turned aside, the fascia propria of the sac was exposed, which being opened, the hernial sac was laid bare. The appearance of the sac was very unusual; it looked like a bladder which had been long macerated in water, and doubts were expressed if it were not intestine. When it was struck with the finger it fluctuated, but upon feeling through the fluid the intestine could be perceived at the upper part of the sac, forming a hard tumour there, and involved in a quantity of fluid. A strong feculent smell issued from the external surface of the sac, and we therefore concluded the intestine was mortified, and that fæces had escaped into the sac. An incision was made through the hernial sac with very great caution, and a quantity of liquid fæces immediately escaped from it, and at the upper part of the sac close to the crural sheath the intestine was found mortified, and occupying not more than one third of the cavity of the sac, and having a large circular opening in it, with thickened and inverted edges, which were of the colour of venous blood. I introduced my bistoury upon the finger into the hernial sac, and cut the orifice of the crural sheath, but still I was unable to draw down the intestine, and passing my finger further within the sac, I felt the posterior edge of the crural arch and fascia behind it forming a strong stricture, which I divided upwards and inwards, and thus liberated the intestine, for then a large quantity of feculent matter issued from the opening in it.

The portion of intestine which had been strangulated, and which was about two inches and a half in length, was then cut away and the ends of the intestines joined by three sutures, so as to leave a small opening for the discharge of fæces, and the ligature which passed through the back part of the intestine next the mesentery was confined to the mouth of the hernial sac.

The edges of the wound were brought together by sutures, excepting that a small opening was left for the escape of the fæces.

During the operation she vomited frequently, but only once after it was concluded; her pulse were then 108 and languid. Thirty drops of tincture of opium were ordered her after the operation.

Evening, the vomiting had ceased; abdomen less tense and painful; pulse about 112; tongue dry and furred; countenance distressed; eyes frequently rolled upwards; extremities warm; she had not slept, although she had taken a grain of opium in addition to the thirty drops.

November 9th, the vomiting had not returned; abdomen soft; but she complained of slight pain in the stomach; the wound discharged freely, and the fluid was similar to that which she had previously vomited; but she had no evacuation per anum, and whatever she drank in a few minutes escaped at the wound; her pulse 130, and she denied having slept.

November 10, every symptom as above, with increasing debility; tongue very brown; skin hot; complained much of want of rest, and an opiate was given her. The nourishment she took, consisting of tea, broth, and porter, was speedily discharged at the groin.

November 11, she remained very much in the same state, excepting that the debility every hour increased, and she died in the morning of the 12th, sensible to the last, and complaining of pain in the abdomen.

Examination.—The abdomen was flaccid, the integuments over the artificial anus were of a livid colour, but not mortified. The stomach was pale and contracted. The small intestines between the stomach and the protruded intestine were inflamed, the minute vessels being all turgid with blood.

The ileum was the protruded intestine, and it was its upper part which had descended; below the protruded part to the cœcum the intestine was pale and contracted.

The large intestines were not inflamed; there was no effusion of fluid into the cavity of the peritoneum, nor any adhesion of the intestine within the abdomen; but the protruded intestine was firmly glued to the inner side of the sac.

On the opposite side I found a small crural hernia, of which I have given a plate.

For the account of the symptoms after the operation, I am indebted to my friend Dr. Farre, whose judgment, accuracy, and perseverance, are required only to be better known to raise him to the highest rank in his profession.

Case.

Emma Dollett, of Haggerstone, aged sixty-eight, was attacked on Sunday, July 26, 1806, with symptoms of strangulated hernia, which continued until the next Thursday, when she sent for Mr. Weston, Surgeon, in Shoreditch. Mr. Heriot (Mr. Weston's assistant) visited her, and found a crural hernia on the right side, which he made some efforts to reduce. Mr. Weston, who saw her three hours afterwards, repeated the attempts to reduce it; but, although the tumour lessened, it did not entirely disappear. At nine o'clock in the same evening I was sent for, and found a crural hernia on the right side, the skin over it much inflamed, and it pitted under the application of my finger. The tumour diminished under the pressure I made, but did not disappear. She had considerable pain in the abdomen, vomited frequently, and had a slight hiccough; her pulse was small and frequent, but she thought the symptoms less violent than in the morning. However, as the tumour remained, the symptoms continued, and the state of the skin indicated the greatest mischief in the intestine, I thought it right to advise the operation, to which she readily consented. A crucial incision was made through the skin, and the cellular membrane beneath it was found very much thickened and condensed. A fascia which distinctly involved the hernial sac was cut open, after which the sac was divided, and a quantity of omentum (about half an ounce) was found, which had a strong feculent smell; and, when I pressed upon it, a liquid feculent matter issued from the inner corner of the sac, though, on farther examination, no portion of intestine could be found from which this discharge could have issued.

I next dilated the stricture, and thought whilst doing this that I could perceive a small portion of intestine within the orifice of the hernial sac, and securing it between my finger and thumb, I carefully dilated the orifice of the sac.

I then drew forwards the substance which I held, and found it to be a portion of intestine, about the size of the end of my finger, and about three quarters of an inch long, of a very dark colour, and it had two small holes in it, one which would almost admit the blunt end of my probe, and the other only the point. Both these holes were circular and passed through the coats of the intestine, so that feculent matter escaped through them when I pressed upon the portion of bowels adjoining to them. It now became an object of consideration to determine what should be done with this perforated portion of intestine. It might either be sewed to the sac, and left in that situation, so as to allow of the escape of the fæces, or it might be returned into the cavity of the abdomen, or a portion of it might be cut away, and the ends united; I preferred the latter mode, therefore spreading the portion of strangulated intestine in my hand, with a pair of scissars, I cut off the sphacelated piece, and then made three sutures upon the intestine to bring its edges together. The divided edges bled freely; but this was checked when the ligature were drawn together. The intestine was then pushed as near as possible to the mouth of the hernial sac, and the threads left hanging from the wound; the protruded omentum was cut off, and the edges of the wound were brought

together every where, except in the centre, so that if feculent matter did escape from the intestine it might pass through the wound, and be prevented from being effused into the cavity of the abdomen.

Immediately after the operation, she was seized with violent shivering and sense of coldness, but when she got into bed she soon became warm, and her pulse, which was small during the operation, became fuller after it, and she said her pain was less.

Friday, August 1, she had passed a good night, having slept several hours; her belly is still tense, but much less sore when pressed. The intestine appears florid. She has had no feculent discharge from the wound, nor any stool: she has vomited once since the operation, and the eructations still continue; her pulse is 96, and she has little constitutional irritation.

Saturday, August 2, I received the following account from Mr. Weston:—A large quantity of liquid fæces have passed from the wound; the abdomen has become flaccid; she passed a good night, and her pulse is only 92.

Saturday 3, Mr. Weston wrote that he had seen our patient this morning, and found the parts looking well, the belly soft, fæces discharging at the wound, mixed with a quantity of gelatinous matter, having the appearance of coagulable lymph effused under inflammation. The pulse 84; the tongue cleaner, and all the appearances very favourable.

Monday 4, I saw her; she has passed a good night; her belly is quite reduced from the state of tension; she has no vomiting; her pulse is 84, but rather feeble; her stools are not feculent, but of a green colour, and mixed with the mucus of the intestine; when she drinks, the fluid passes from the artificial anus in an hour. Some veal she also took passed off in an hour very little changed.

The intestine appears florid, but it seems to have a tendency to protrude, and I ordered a dossil of lint to be pressed upon it, and to be occasionally removed for the evacuation of the fæces.

Wednesday 6, she was entirely free from constitutional irritation, and much invigorated by having taken some wine. The intestine appears florid, and has a quantity of mucus hanging from it. The artificial anus appears to be established, and the opening into the intestine is sufficiently large to admit the finger.

From this time to 23d of September, I had occasionally reports respecting her from Mr. Weston, and sometimes saw her myself, but nothing occurred worthy of notice, excepting that the skin surrounding the wound was often inflamed by the discharge from the intestine, and required the application of a lotion of acetite of lead, with tincture of opium, and sometimes a saturnine ointment, an aperture being left in the lint for the discharge of the fæces.

On the 23d of Sept. I was sent for on account of the discharge of the fæces having stopped. I found the wound very much contracted, and the hole into the intestine so small, that it would not admit a bougie. She had been eating some rabbit and roasted apple before the discharge of fæces had ceased. I advised that a poultice should be placed on the wound, and nothing farther done, supposing some portion of the apple, undissolved, had stopped the aperture of the intestine. She vomited, and the belly became distended. After having remained in that state forty-eight hours, a large discharge of fæces took place from the wound: but she became very feeble, and never entirely recovered her former strength. She died on the 9th of October.

I opened the body, and found the abdomen free from inflammation. The lower part of the ilium formed the artificial anus. The colon and the large intestines had become of very small size, and contained only a little mucus. The orifices of the intestine were both very small, but more especially the lower, that which was continued to the large intestine.

These cases strongly point out the danger of delay; and so strongly am I impressed with this belief, that if I were myself the subject of strangulated crural hernia, I should only try the effect of tobacco clysters, and if they did not succeed, would have the operation performed in twelve hours from the accession of the symptoms.

I insert the following case, in addition to those given in the first part, to shew, that although the intestine appearing healthy at the time of the operation may be returned into the abdomen, division of the stricture may fail to relieve the intestine, inflammation may go on until gangrene ensues, and the contents of the intestine may be discharged from the sac.

Femoral hernia on the right side in a patient of Mr. Webb's, Hoxton Square, aged thirty-two. Tuesday, May 12, ten o'clock at night, had been strangulated twenty-nine hours; tumour appeared double, a gland being situated on the outside and a hernia on the inner; taxis would not succeed. Case.

Operation.—First incision oblique in the direction of Poupart's ligament; second at right angles; exposed a thin superficial fascia, then the fascia propria, but in cutting through it I opened the sac and a quantity of yellowish fluid was discharged; I then cut the fascia propria with my bistoury, and tore the sac with my fingers; the first was much thicker than the second. The intestine was of a dark venous colour, and there was a small portion of adhering omentum. I passed a director into the mouth of the sac, and a probe-pointed bistoury on it, and dilated the sac upwards; the intestine only was returned, and the edges of the wound brought together by adhesive plaster only; ordered warm flannel to the abdomen; magnes. sulph. 2 drachms, omni quarta hora; to be bled if there are signs of inflammation.

Thirteenth: had one stool last night, and has had two to-day; bled to 12 oz. to night, as her pulse was quick and hard, and she had some pain in the abdomen; no vomiting since the operation, and the pain little in comparison; ordered to continue her purging medicine.

Mr. Webb's letter:—

Dear Sir:—With concern I make my report respecting the state of your patient, whom you were so kind as to assist on Tuesday night last. When I visited her the following morning I found her calm and free from pain; no particular pain of the abdomen or tension; had got some sleep; passed urine but no stool; however, soon after she had a hasty evacuation, in consequence of what she had taken during the night, viz. 6 drachms of magnes. sulph. in three portions. I saw her again in the evening, when I was informed that pain came on in the course of the afternoon about the umbilical region; her pulse was more quickened and rather full; I took away a pound of blood, which she bore well, and directed a saline medicine; she passed a restless night; discharged urine and has had another stool; the pain still continues about the umbilical region, but now darts upwards to the

scorbiculus cordis with a degree of tension of the abdomen; being now doubtful from the state of her pulse of another general bleeding, have directed a number of leeches to be applied about the navel, and the discharge to be promoted by fomenting the abdomen with decoct. flor. cham. Such was her state about noon, and I purpose visiting her again this evening, when I will follow any directions you may think advisable, should this note be so fortunate as to meet you at home.

I remain, dear Sir,

Your's most respectfully,

THOMAS WEBB.

Hoxton Square; Thursday, May 14th.

Five o'clock this day, just before receiving Mr. Webb's note, I saw her. She was in great pain; pulse faint; could scarcely breathe; her pulse quick and hard; belly tender and swollen; no vomiting; has had three stools; she is evidently suffering from inflammation of the bowels; I took away 10 oz. of blood, which made her faint; her pulse became fuller and somewhat slower afterwards; she had one stool since Mr. Webb saw her. Evening, ten o'clock: she is much easier; countenance less anxious and pale; she breathes more easily; her pulse is not so quick, and is softer; she has had three stools since the morning, in all five to-day; she continues the fomentations and magn. sulph.

Fifteenth: evening, half-past eight o'clock: has been in great pain ever since six o'clock in the morning; the seat of the pain at the stomach; deep breathing gives great pain; great tenderness of the abdomen; has had three stools; no vomiting; pulse quick and small; bled to 14 oz.; continues the magn. sulph.

Sixteenth: husband's account;—pain at the pit of the stomach which she rubs; has had several stools, six; no vomiting; seems very low; makes water freely. Evening, ten o'clock; breathing very short and quick; pulse very quick and small but regular; she seems very low. I had ordered her in the morning the saline draught, with magn. sulph. 1 drachm, and tinct. opii gtt. 5. Prior to this she had three stools; she has since had frequent eructation, which she had not before; vomited twice, which was not the case before, but has been in less pain; the belly is very tender. Mr. Webb has ordered her a blister to-day, which has risen; she has made plenty of urine; mind perfect.

Seventeenth: husband's account;—has had six or seven stools, last costive; makes water easily; eructations frequent; vomited four or five times in the night; is easier this morning; complains of the soreness of the wound; takes nourishment; tinct. rhei 2 drachms, magnes. sulph. 2 drachms, infusum rosæ 1½ oz. M. Evening, nine o'clock: countenance has colour; belly softer; has had two stools since the morning; speaks more lively; breathing deeper and less quick; pulse 114; eructations; no vomiting; takes nourishment; mind perfect; abdomen loose; no pain or soreness.

Eighteenth: has had three stools in the night and one in the morning; no vomiting; takes plenty of nourishment; eructations constant; sits up in bed; seems in no pain; passes some wind per anum; makes water; blistered part very sore; no soreness of the abdomen; ordered a little wine. Evening, nine o'clock: is dying; the breathing is very short and gasping; the pulse very quick and irregular; has vomited twice this morning, but has had stools.

Nineteenth: husband's account;—is more lively this morning; a considerable quantity of fluid discharged from the wound; ordered wine. Evening, half-past nine: speaks more strongly; belly tender, particularly over the wound; breathing 60; pulse 108; vomited this evening; has had one stool; complains occasionally of pain; ordered a magnes. sulph. draught.

Twentieth: very low; pulse quick; skin hot; has vomited, and has had no stool since the last night, when she had three as she says by the wound; a large quantity of liquid matter discharged at the wound, and a great quantity of air; she takes plenty of nourishment, but seems not perfectly collected in mind.

Twenty-first: still passes air and fluid by the wound; pulse very low; she also seems depressed; what she takes passes off in half an hour by the wound; vomits often; takes wine; sensible; passed a very restless night.

Twenty-second: pulse quick; constantly almost discharging bilious matter by the wound; vomiting sometimes; takes wine and nourishment, but seems very low; ordered opii gtt. 30.

Twenty-third: still takes nourishment, though she is very low; no vomiting; passes a good deal of air by the wound.

Twenty-fourth: pulse about 110; has had two plentiful stools by the natural passage; no vomiting; omentum sloughing at the wound; is scarcely able to speak, and that has been the case for a week.

Twenty-fifth: extremely weak; pulse very quick; scarcely able to inspire, i. e. breathes very shortly.

Twenty-sixth: died at four o'clock in the morning.

If the intestine is mortified, it requires great care in the operation to prevent the portion within the abdomen from being torn from the mortified part, which if the finger is forcibly introduced into the sac will undoubtedly happen, and the fæces escaping into the abdomen will destroy the patient in a few hours. To prevent this, after exposing the intestine, and finding it mortified, the finger should not be put into the mouth of the sac, but the bistoury only be passed into the stricture; and when this is divided, the intestine is to be gently drawn down into the sac to expose the part at which it has been girt.

Omentum.

With respect to the omentum, if it adheres, its adhesions may be safely torn through with the finger; and if more of it has descended than can be easily returned, or if it has become hard and knotty, it must be cut away. I have done this in inguinal, crural, and umbilical hernia, and have seen it done by others without any bad consequences ensuing. It must be cut through where it is sound, which it will be known to be by the vessels bleeding, and this is to be the criterion of its being done sufficiently high up; and the vessels are to be secured by ligatures, and the omentum returned only to the mouth of the hernial sac.

Elizabeth Whittle, aged fifty-six, was admitted with a strangulated femoral hernia on the right side, always reducible by pressure or recumbent posture until Sunday morning eight o'clock, seven days prior to her admission, when it first became strangulated, with the following continued symptoms:—Retention of urine; no stools; sickness, and vomiting every thing she took; pain in the tumour, and pain and tension of the abdomen. Two days before her admission a medical gentleman saw her and tried to reduce the hernia, but could not succeed, and he recommended her to come to Guy's Hospital, where she was admitted at twelve o'clock. At four o'clock Mr. Cooper saw her and performed the usual operation, in the course of which there was nothing remarkable, except a thick layer of coagulable lymph interposed between the sheath and hernial sac; the latter being opened a piece of omentum as large as a hand presented itself, adhering around the orifice of the sac and enveloping a small portion of intestine as large as a walnut, which was not discovered until the omentum was in reality torn through. The intestine was of a dark purple colour; this being sound it was immediately returned into the cavity of the abdomen; and as the omentum could not be returned from its adhering to the whole circumference of the hernial sac, Mr. C. thought it necessary to be cut off for this and another reason, because circulation in it had ceased, and the blood was found coagulated in its vessels. The wound was closed, and the patient put to bed.

On Wednesday, three days after the operation, not having had any stool, and her abdomen being painful and tense, a clyster was given of broth and castor oil, which operated freely.

Mrs. Clark, aged forty, a patient of Mr. Brickenden's, of Horsleydown Lane, had, in August 1799, a strangulated crural hernia on the left side, of an oval form and considerable size, occupying almost the whole of the groin, and extending from the tuberosity of the pubes near to the spinous process of the ilium. Symptoms of strangulation had taken place forty-eight hours before I saw her, and during the last six hours she had frequent hiccough. I immediately attempted to reduce the hernia by the hand, but without success; and believing that no time was to be lost, I advised the operation, to which she very readily consented. The first incision was three inches long, and nearly midway between the pubes and femoral artery, which, after dividing the fascia that covered the hernia, left the surface of the sac exposed; a very small puncture was made into the sac, and a director being passed up to the crural arch, I laid open the whole of the anterior part of the sac. This exposed both omentum and intestine; the latter of which was of a coffee colour, and the omentum adhered strongly to the inner part of the sac. I then passed a director into the mouth of the sac, carrying it about half an inch behind the crural arch; and as the hernia was large, I cut not only the mouth of the sac, but also the anterior edge of the crural arch, in the direction upwards and inwards.

The intestine was then particularly examined to observe whether it began to recover its natural colour, and its veins were pressed to see if the blood returned into them with freedom, which being the case, and no livid spots appearing, the intestine was passed into the abdomen.

The omentum being hard and thickened, all that had protruded was cut away, except a small portion which was left with a view of filling the mouth of the sac, and thereby lessening the probability of a future descent.

The edges of the wound were then brought together and closed by three sutures, and upon her being put to bed thirty-five drops of tincture of opium were given to her. In two hours she had two evacuations, and in the course of the evening had several others. The wound looked well on the following day, and she was free from constitutional disorder. However opiates were still required, as the stomach remained irritable, and she had vomited several times. On the next day this symptom disappeared and she seemed to be doing well. The wound was perfectly healed in about three weeks.

She was afterwards obliged to wear a truss, as the tumour became rather larger than before the operation, so that no advantage was derived in this case from leaving a portion of omentum with a view of closing the hernial orifice, which I attributed to her being suffered to rise without a truss before the wound was healed, or time had been given for the omentum to adhere.

Putting a ligature around the whole of the protruded omentum is either useless or dangerous: if it is placed upon the mortified part, it is obvious it must be useless, as the sloughing process will go on above it: if it is placed upon the healthy part of the omentum, why divide the stricture, as another is made immediately by the thread which is applied around it.

Leaving the omentum in the hernial sac to slough appears to me unadvisable, because it is unnecessarily preserving a discharge for a length of time and protracting the cure. I have never seen this intentionally done, but in a patient in Guy's Hospital (*see the former part*); the omentum which had been returned into the abdomen redescended into the sac on the sixth day from the operation and gradually sloughed, keeping up during the time a very offensive discharge, and a great degree of constitutional irritation. A circumstance somewhat similar happened in the case of Mrs. Culf, which is mentioned under the head of umbilical hernia.

When the protruded parts have been returned into the cavity of the abdomen sutures are to be made upon the integuments, and the wound closed as carefully as possible by lint, adhesive plaster, and bandage.

When the omentum is left in the sac it frequently happens that inflammation takes place, and sloughing is the consequence; this will sometimes exhaust the powers of the patient, already enfeebled by the previous effects of the strangulation, and destroy life. The practice of cutting away the omentum, therefore, is highly advisable, when from its bulk or from suspicion of its vitality being impaired, its return becomes questionable.

Mrs. ———, aged sixty-four, was seized on Monday the 18th of May, 1809, with symptoms of strangulated hernia. On Tuesday she sent for Mr. Paine of Blackfriars Road, who made some attempts to reduce it, which he repeated on Wednesday by using the taxis and tobacco clyster. Thursday 21st, she was sent to Guy's Hospital: at half-past six o'clock in the afternoon I saw her. The tumour was very large, reaching from the spinous process of the pubes near to the ilium, and inflamed; the violence of the symptoms had abated; she

vomited, but not frequently, but she had nothing pass from the bowels but what must be considered as the contents of the rectum and lower part of the colon; her pulse was about 100 and not very low, but a little hard and thready. I operated immediately.

First incision in the course of Poupart's ligament, exposed the superficial fascia, which I divided. Second into the fascia propria and sac, which I dilated upon a director, and divided the stricture at right angles with Poupart's ligament; some water escaped, coagulable lymph and a large clot were also discharged; omentum was then exposed, but no intestine. I tore the omentum, and found a piece of the ileum encysted in it, which was much discoloured, looking like an intestine bruised but not mortified—colour chocolate brown without spots. I dilated the stricture with my own knife directly towards the umbilicus, as far as the edge of the ligament; the intestine did not recover its natural colour, but improved in its appearance; I emptied it first, and then easily returned it. The omentum (which was in very large quantity) I cut off, sewed the two corners of the integuments to the lower flap, laid on adhesive plaster, and the operation was terminated. After the operation, as she was very low, I permitted her to have a little porter. This case had been mistaken by all at the hospital for an inguinal hernia, excepting my apprentice Mr. Jones.

Friday, 22nd: had two stools during the night; no vomiting; complains of some pain and tenderness of the abdomen. Evening: has had three stools, but complains of violent occasional pain in the intestines; bled to 6 oz.; clyster; fomentation of chamomiles in a bag; pulse 104.

Twenty-third: has had stools during the night; has no vomiting; pulse irregular, about 72; belly tender; fomentation continued.

Twenty-fourth: has had stools; has no vomiting; belly less tender; took opium last night; clysters continued and the fomentation bag.

Twenty-fifth: no vomiting; has had no stool, but is stronger and in no pain.

Twenty-sixth: stool from a clyster; wound opened, looks well; belly a little tender; complains of pain and difficulty in making water.

Twenty-seventh: belly a little tender; has had stools; pulse about 70, but intermittent; seems low; has made plenty of urine without pain.

Twenty-ninth: wound inflamed; portion of omentum sloughing; is better in health and spirits, and the belly is not tender.

June 2nd: better in health; wound looks well; sloughing of the omentum continues; wound is dressed; the edges of it are a little excoriated.

June 5th: omentum sloughed off yesterday; the wound looks healthy to-day; she seems, however, to be still weak, and her pulse is very irregular; her bowels she did not complain of; however, from this time she continued improving, and was soon discharged cured.

Case.

Mrs. ———, residing at Mr. Fisher's, Cheapside, had a hernia on the left side, which became strangulated while she was labouring under a severe cough. The symptoms, which began to shew themselves on the 28th of the month, were constipation of the bowels, vomiting, and pain in the region of the stomach. These continued unabated during the next day, and on the 30th, the second day from the commencement of the symptoms, she had hiccough. The tumour had been from the commencement hard and painful upon pressure. Attempts to reduce it were made without success. The hot bath, tobacco clysters, and the application of ice to the part, were employed, but produced no effect. The operation was then determined upon.

On opening the sac, which contained hardly any fluid, both omentum and intestine were found strangulated; the former was of a red, the latter of a brownish red colour. After dividing the stricture the intestine was emptied and readily returned, but the omentum was found so strongly adhering to the parietes of the sac as to render its return impossible. It was therefore left in the sac, and the wound closed as securely as possible by sutures. She passed several stools shortly after the operation, and before any medicine was taken. The next day there was some degree of heat on the skin about the wound, and a considerable watery discharge: saline medicines were ordered for her. She was very much inclined to dropsy.

On the second day from the operation some inflammation was observed around the incision, and one of the stitches was removed. She had no unfavourable constitutional symptoms. Fomentations and poultices were applied to the part, and her bowels were ordered to be kept freely open.

On the third day the inflammation had greatly extended itself, and the swelling was considerable: the remainder of the stitches were taken out.

On the fourth day the omentum which had been left in the sac was discovered to be in a sloughing state. Considerable suppuration and ulceration took place at the lower part of the sac, and a quantity of matter with portions of the sloughing omentum were discharged. Her general health remained good, and she recovered.

CHAPTER IV.

Of the Varieties of Crural Hernia.

It is by no means common to meet with deviations from the usual structure of crural hernia. Those which have occurred to me are the following :

The fascia which usually covers the hernial sac has given way, so as to allow of a portion of the tumour to pass before it; thus dividing the tumour into two parts, with a sort of hour-glass contraction between them. A variety of this kind would embarrass a person who was not aware of its nature, but it adds little to the real difficulty of the operation to one who understands well the anatomy of the parts: for as soon as the fascia is divided by the knife the hernia reassumes its usual appearance. See Case III.*

Rupture of the superficial fascia.

Another variety is when the tumour does not quit the sheath for the crural vessels. The appearance of this disease is that of a general swelling of the fascia on the inner side of the femoral vein, but without its producing any circumscribed tumour. The part swells whenever the patient coughs or uses any considerable exertion, but the swelling diminishes, though it does not entirely subside, when he stands at rest. I have given a plate of this disease from a dissection which I made, and believe it to be not an unfrequent variety, as I have met with it three times in the dead body, and it existed on both sides in each. In this case the hernial sac descends as usual on the inner side of the femoral vein; but instead of passing out of the sheath at the place at which the absorbents enter, it is continued downwards within the sheath, passing anteriorly to the femoral vein, and descends as far below the crural arch as the sheath will allow, the distance being in general from two to three inches.

Hernia within the crural sheath.

This species of hernia is very easily reducible, and, I believe, is little liable to become strangulated, as the mouth of the sac is of considerable size. A truss should be applied in this hernia, both to prevent its increase, and to obviate the danger of its passing out of the sheath, in the usual manner. This species of hernia may also give rise to another variety by passing out of the sheath at the opening by which the external cluster of the absorbent vessels enter it. The cause of this hernia within the sheath is the entire want of the process of fascia which passes on the inner side of the crural vein, so that the hernia turns before the vein instead of descending by its side.

If the variety of herniæ above described were to become strangulated, the operation would be attended with some difficulty, as the parts are more concealed. The superficial fascia must be first cut through, and the crural sheath laid bare, and the latter being then divided longitudinally, the hernial sac will be exposed, and is to be opened in the usual manner, and the stricture being felt for with the finger, is to be divided in the same direction as in the common crural hernia. The difficulty therefore arises from the depth of the situation of the hernia, and this circumstance will often make the surgeon more than usually doubtful of the real nature of the disease. The stricture in this case must be always at the posterior edge of the crural arch. (See Plate 8.)

A third variety of crural hernia which I have met with is that in which the hernia is formed in part within the sheath, and also in the common way. I have given a view of the inflated sac of a case of this kind, which was taken from the body of a patient of Dr. Marcet's, in Guy's Hospital, who died of aneurism of the aorta, and who had, at the same time, a crural hernia on the right side. In dissecting this case I directed one of the students to pass his finger down into the sac whilst I cut upon the swelling. After dividing the superficial aponeurosis I laid bare several absorbent glands which were dissected away, and the femoral sheath exposed, which being cut open the hernial sac came into view. I removed the parts in order to preserve them, and on examining the femoral sheath I found that its inner side had given way, and a small hernial sac had been

Hernia in part in the sheath, in part out of it.

* Hesselbach, in his thirteenth plate, has given a view of a femoral hernia in the male subject, where the sheath had given way in different parts, so as to give to the sac an appearance of five small tumours; this was probably owing to the apertures through which the absorbents pass having yielded, while the general texture of the sheath had resisted its pressure. "Haud raro contingit, ut in subjectis masculis sacci hernialis corpus aut duplex, aut in plura divisum loculamenta appareat; scilicet cum tendinosi textus retiformis fasciculi in lamina externa sacci hernialis impetui restiterint, ille ipse per textus intervalla prorumpit. Ejusmodi herniæ in subjecto masculo repertæ exemplar in hujate præparatorum anatomicorum collectione asservatur.—p. 45, *Op. Cit.*—ED.

produced through the opening by which the absorbent vessels usually pass; whilst the greater part of the sac was stretched across the crural artery and vein, and had in consequence extended the sheath in which these vessels were contained. (*See Plate 4.*)

I have thought it right to mention this variety, although it would make little difference in the operation; as the part the most likely to be strangulated is that which passes out of the sheath in the usual manner, and not that which remains within it.

Umbilical artery on the outer side of the sac.

In one of the plates the umbilical artery, which usually passes on the inner side of the sac by the side of the bladder will be seen to pass on its outer side, and before its neck. It is probable, that it is in these cases the bladder protrudes into the hernial sac; but I could not ascertain it in this instance, as the omentum only remained down, but the bladder was very capacious, and was in contact with the orifice of the hernia.

Variety of the obturator artery.

The last and most curious variety of crural hernia which I shall mention, is one in which the obturator artery passes round the neck of the hernial sac.*

Dr. Barclay's case.

I am indebted for the specimen of this variety to the late Dr. Barclay, Teacher of Anatomy at Edinburgh, and well known to the public for a valuable work, in which he has attempted to improve the language of anatomy, by substituting a philosophical and classical nomenclature for the perplexed and unmethodical set of terms now in use. This preparation (which Dr. Barclay was so kind as to send me for my inspection from Edinburgh) was taken from the body of a young woman, whose history was unknown.

On examining the situation of the hernial sac, it was found taking its common course under the crural arch, and situated, as usual, on the upper part of the thigh; but on examining the neck of the sac, it was observed that the epigastric and obturator arteries arose by a common trunk, and that they passed anterior to the sac before they divided; after which the epigastric artery proceeded upwards to the rectus muscle, and the obturator artery passed backwards on the inner side, and close to the neck of the sac, to the obturator foramen, through which it usually passes. The obturator artery, indeed, very frequently deviates from its natural course, and instead of arising separately from the internal iliac artery, it derives its origin from the external iliac in common with the epigastric. But in all the cases which I have myself dissected, where this variety existed with crural hernia, the obturator has passed into the pelvis on the outer side of the neck of the sac, entirely out of the reach of any injury by the knife, as will be seen in two of the plates. In twenty-one preparations of crural hernia, I found six out of the twenty-one had this variety in the origin of the obturator artery.† When therefore this artery passes before the sac (as in the case observed by Dr. Barclay), the arterial trunk common to it and to the epigastric is of unusual length; for when the trunk is short, the obturator passes behind the sac. A hernia thus situated is surrounded by blood-vessels, except at its posterior part, which might seem to render it advisable to deviate from the usual mode of operation to prevent this blood-vessel from being wounded. This however is not so liable to happen where the division of the stricture is made upwards, or a little upwards and inwards; for it will be found that the greatest distance between the artery and the hernial sac is at its anterior part. It is impossible to feel this artery before the introduction of the knife, for the finger cannot be passed behind the posterior edge of the crural arch, beyond which this artery is placed, until the stricture has been divided. The sac therefore is to be carefully divided anteriorly; but even supposing the artery to be wounded in the operation, it may be asked, what other direction of the wound would afford greater facility of tying the bleeding vessel? For by slitting up the crural arch, and drawing down the mouth of the hernial sac, the vessel would be brought into view, and might be secured.

* Cloquet, in examining 250 subjects for the purpose of obtaining an average as to the origin of the obturator artery, found the following distribution.

Subjects.	Males.	Females.	
In 160	87	73	origin from the internal iliac on both sides.
In 56	21	35	epigastric on both sides.
In 28	15	13	internal iliac on one side, epigastric on the other.
In 6	2	4	femoral artery.
250	125	125	

As these subjects were examined on both sides the following was the proportion.

Obturator arteries.	Males.	Females.	
348	191	157	origin from internal iliac artery.
152	58	94	epigastric or femoral artery.
500	249	251	

In this latter calculation M. Cloquet has accidentally placed to the female account a male subject. It as nearly as possible coincides with the proportion of cases mentioned by our author, in which the obturator arose from the epigastric or femoral arteries, namely, rather less than one in three.—ED.

† The obturator artery arises more frequently from the epigastric than I have here mentioned, but is found to do so in less proportion in crural hernia, because this situation of the artery has some tendency to prevent a protrusion by passing over the crural aperture.

My friend Mr. Wardrop, of Edinburgh, has communicated to me two cases of a similar kind taken from each side of the same subject. His words are, in explanation of a sketch which he favoured me with, that "the peritoneum is thrown aside, and the parts underneath exhibited without any further dissection. The epigastric and obturator arteries come off from the iliac in one branch, and the accompanying veins divide in the same manner. The obturator artery creeps close on the muscle, and completely surrounds, or rather passes over the mouth of the hernial sac. The sac is extremely small, and its orifice is blocked up with a very large lymphatic gland."

Mr. Wardrop's case.

CHAPTER V.

Of the Operation inwards.

THE division of the stricture inwards, in the operation for strangulated crural hernia, was first published by Gimbernat, a Spanish surgeon, in his treatise on this disease. The author having dissected the parts with great care, and finding that the firmest part of the stricture was on the inner side, and that the blood-vessels covered the orifice of the hernial sac on the outer and on the anterior parts (the crural vein and the epigastric artery lying in the former direction, and the spermatic cord on the latter), was led to believe that the operation inwards was the safest mode of dividing the stricture. If anatomy only directed my judgment I should concur in this opinion; but it appears to me that the danger in crural hernia is not derived from the vicinity of these vessels, but from the chance of wounding the intestine. Nor does this operation entirely prevent even the danger of hæmorrhage.

Reasons for it.

The objections which I have to urge against this operation are the following: First, it very much increases its difficulty; for the crural hernia lies buried deep within the thigh, and the orifice of the sac is proportionally difficult to be reached. Even where the stricture is divided anteriorly, the instrument must be passed down to some depth before it can be introduced within the stricture; but if the division is made inwards, from the obliquity of Gimbernat's ligament, the bistoury must be buried so deep as to be entirely obscured by the surrounding parts. Having tried both these modes of operating, I can assure those who have not had an opportunity of making a comparative trial, that the latter operation is much the more difficult to perform.

Difficulty of the operation increased by it.

Secondly, in Gimbernat's method a danger is incurred of wounding the intestine in two different ways. In looking for the seat of the stricture on the inner side, the intestine (which in crural hernia descends inwards) is obliged to be drawn very much to the outer side, to allow of the finger, or of a director, to be passed to the orifice of the stricture. In doing this the intestine is much stretched at the strictured part, and if it has been long strangulated it readily tears through at this place, and the fæces are discharged at the wound. This I have reason to believe, in one of the following cases, was the cause of the laceration of the intestine and consequent death of the patient.

Danger to the intestine.

Mrs. Phillips, aged fifty years, was seized on Wednesday, February 16, 1804, with symptoms of strangulation in a hernia to which she had been subject for twelve years, during which time it had been occasionally smaller or larger, but never completely reduced. On the day above mentioned it suddenly increased, during a violent exertion, became very painful, and produced much uneasiness in the bowels, with frequent vomiting. On the 24th, Mr. Robert Kent was called to her, who advised her going to Saint Thomas's Hospital, and she was accordingly admitted on the 25th.

Case.

The tumour was on the left side, its long axis, passing in the direction of the crural arch, or Poupart's ligament, anterior to which it was situated. It bore so strong a resemblance to an incipient inguinal hernia, as to deceive several of the most intelligent pupils; but on examining her, and drawing the tumour downwards, I found the crural arch passing above the sac, and the tuberosity of the pubes on its inner side, which made the true nature of the case sufficiently obvious.

The symptoms were not so urgent as might have been expected from the duration of the disease, for the tumour was not inflamed, the abdomen but slightly tense and painful, and the countenance did not shew any remarkable sign of anxiety. Her pulse, however, was quick and *thready*. After an unsuccessful trial of the taxis, and a tobacco clyster, I proceeded to perform the operation.

An incision was made in the long axis of the tumour (transversely, therefore, to the neck of the sac), and the fascia which it exposed was next divided to bring the sac in view. This was next opened, and a little clear serum escaped. A director being introduced, the opening into the sac was extended up into its neck, which shewed both intestine and omentum strangulated; the former, discoloured as much as is usual in these circumstances, but not to any remarkable degree. The intestine being drawn towards the spine of the ilium, which was obliged to be done to reach the stricture, a director was passed up into the mouth of the sac on its inner side opposite the

pubes, and a common probed bistoury being passed upon this, the stricture was divided inwards along the margin of the pubes. The intestine was then easily returnable; but, as the last portion of it was entering the abdomen, a small quantity of feculent matter escaped from the orifice of the sac, but too late to prevent the return of the intestine, which, had I observed this circumstance sooner, I should have done, and made a small suture upon it. The omentum was then returned, and the wound dressed. I saw her an hour and a half afterwards, when she complained of violent pain in the abdomen, and was extremely restless. I removed the dressings, and saw feces discharged from the wound, on which I ordered a poultice only to be applied. The pain and restlessness continued till her death, which happened within four hours and a half after the operation.

On examining the body I found the feces effused into the cavity of the abdomen, the intestine universally inflamed, the portion of gut which had been strangulated, but little altered in colour, but with a hole in it opposite to the stricture.

Whether in this case the intestine gave way at the strictured part by drawing it aside, or was injured by the knife, it is impossible to determine, but I was resolved never again to cut inwards, on account of the danger of tearing, as well as of cutting the intestine.

Case.

A woman, aged forty-five, who had long been troubled with crural hernia on the right side, was seized with symptoms of strangulated hernia. They had begun at eight o'clock in the evening, and (as she stated) were brought on by suddenly rising from her chair.

On the whole of the following day she vomited frequently, had great pain in the tumour, and her pulse was small and frequent.

Eight ounces of blood were taken from the arm, and attempts were made to reduce the hernia by the taxis, but without success. She was ordered into a warm bath, and the attempts at reduction were repeated, but in vain. A tobacco clyster was thrown up, but it also failed.

At noon on the following day the operation was performed. The intestine, which was discoloured, was found adhering to the sac; but these adhesions were separated without much difficulty, and the stricture at the mouth of the sac was divided inwards, or towards the symphysis pubis; but several incisions were required before the aperture was large enough to allow of the return of the hernia.*

As the intestine was about to be pushed back into the abdomen, its contents were seen to escape from a considerable opening in it. It was therefore confined to the mouth of the sac; and dressings being applied, she was put to bed. I saw her soon after the operation, when she was in most violent pain, and she died at seven o'clock in the same evening.

Dissection.—Having obtained leave to inspect the body, I found feces extravasated in the cavity of the abdomen. The intestines were much inflamed, and, as usual, red lines appeared on them, passing longitudinally on the points at which they adhered. The portion of intestine which had descended into the hernial sac was discoloured, and it was much inflamed above that part; two openings were found in the portion which had been placed at the mouth of the hernial sac. One of these openings had been confined within the sac, but the other had escaped observation, and had been returned into the cavity of the abdomen; it was from this that the feces had been extravasated, and so speedily brought on a fatal termination. (*See plate relative to the operation.*)

The other mode in which the intestine becomes injured, is by being cut in passing the knife. The stricture is too small entirely to admit the finger, and the surgeon, fearful of bruising the intestine by attempting to force his finger up the stricture, introduces a director to guide the incision, or the knife without a director; in doing which, a fold of intestine gets before it, and in the way of the knife, within the mouth of the sac, or still higher, above the sac within the abdomen; but when the incision is made from the anterior part of the sac the intestine is entirely behind the knife. If this accident be immediately discovered, the patient has some chance of recovery with an artificial anus, which may either last only for a time, or continue during life, according to the treatment pursued; but if the intestine is within the abdomen at the time the injury is received, the strangulated portion is returned into the cavity without the wound being suspected, and the patient dies in a few hours, after suffering violent pain, and having the feces escape through the wound. In such cases, on examination after death, the abdomen is found violently inflamed, owing to the escape of bile into the peritonæum. (*See plate relative to the operation.*)

This division insufficient.

Thirdly, there is another strong objection to the operation inwards, which is, that if the hernia is large this mode of dividing the stricture is not sufficient to allow of the return of the protruded parts, for it gives but little additional room, so that great force must be used to reduce the hernia; and often, after all, the parts behind the crural arch must be divided in the usual way, and the whole operation rendered unnecessarily complex.

Obturator artery endangered.

Fourthly, the obturator artery, which, in the usual operation, is only endangered when it varies from its natural course, will be in much greater hazard in the inward incision, as this artery under this variety of course closely embraces the sac on the inner side, but is situated at some distance from its anterior part; and, moreover, if it is cut during the operation inwards, it will be scarcely possible to secure it, which it might be, when the anterior incision is performed.

* I was not present at this operation, but was informed of the particulars by two very intelligent persons who witnessed it.

OF UMBILICAL HERNIA.

CHAPTER I.

Of the Symptoms and Causes of Umbilical Hernia.

IF I had followed the order of frequency of occurrence in my description of the several species of hernia, I should not have hesitated to place the umbilical next in order to the inguinal; but as the parts connected with crural hernia are not only contiguous to, but really form a part of those concerned in the inguinal, I have described the crural hernia immediately after it, that the subject may be more readily understood.

Next in frequency to the inguinal.

The umbilical hernia passes through an opening at the navel, which is formed in the foetal state for the passage of the umbilical cord. This aperture is situated near the centre of the linea alba, and it naturally becomes closed after the funis is tied; but it is never entirely filled by tendon, but only by a condensed cellular membrane, containing the remains of the umbilical vein and arteries. When this part is dissected, the peritoneum is found behind it covered above by the remains of the umbilical vein, and below by the ligament of the bladder and the two umbilical arteries, and the peritoneum will be found to adhere with more firmness here than it does to the rest of the linea alba.

Umbilical ring.

An opening which will admit a common sized quill exists at this part of the tendon, but is naturally filled up by condensed cellular membrane. The skin of the umbilicus is reflected inwards, to adhere to the cellular texture filling up this aperture, and it is this reflection which gives the peculiar form of the navel.

If the umbilical aperture were situated at the lower part of the abdomen no person could escape hernia; and placed as it is, the opening remaining during life, protrusions very frequently take place at different periods, and the disease takes the name of *exomphalos*, or umbilical hernia. The peritoneum, however, is as complete here as at any other part of the abdomen, which I mention particularly, because some have erroneously supposed, that the umbilical cord passes through a hole in the peritoneum behind the umbilicus, and consequently that when the intestine protrudes, during infancy, the umbilical hernia is not covered with peritoneum. But though in the adult the umbilical hernia is sometimes found without a sac, and always when the hernia is large with a sac extremely thin, yet this is not the cause of that variety; and it should be remembered, that the remains of the umbilical arteries and vein are no where situated *within* the peritoneum, but *before* it; for the umbilical arteries passing from the internal iliac arteries by the side of the bladder, are continued to the navel between the peritoneum and abdominal muscles; and the umbilical vein, after entering the navel, is also continued between the peritoneum and abdominal muscles to form the round ligament of the liver. The only natural deficiency is in the tendon at the navel, where an opening is formed for the passage of the blood-vessels, in the same manner as openings are left at the abdominal rings for the passage of the spermatic cords.

Peritoneum complete behind the hole.

It has been asserted, that the umbilical hernia does not pass through the umbilical opening, but by an aperture on its side or near it; but from the dissections which I have made, I believe that it very generally passes through this aperture; and I suppose that the contrary opinion has been founded upon the circumstance of the swelling being rarely just at the centre of the navel, for as there is a strong adhesion of the skin to the centre of the opening, the cicatrix rather gives way upon either side than directly at the centre.

Umbilical hernia begins in the form of a small tumour, about the size of the tip of the finger, at the navel, which can be returned by very slight pressure into the cavity of the abdomen; but by directing the

First appearance.

patient to cough, it immediately reappears. As it increases in bulk it begins to gravitate, so that the anterior extremity of the bend is generally below the level of the umbilical opening. If the person is thin, it becomes very pendulous and distinctly circumscribed, and is then usually of a pyriform shape. If nothing is done to check its growth, it grows to an enormous size, extending downwards towards the pubes. The disease in this state produces a great deal of suffering, and often endangers life if the hernia is intestinal. Almost every thing that is eaten produces flatulency, pain in the protruded part, and sickness; and even slight pressure to return it, gives the same uneasy sensations when the intestine is passing back through the abdominal opening. If no bandage is habitually worn to confine the hernia, the patient feels so much weakness and sinking at the pit of the stomach as to be often incapable of any exertion; and the pain expressed by some patients is excessive. The bowels also are generally irregular, and if the tumour becomes inflamed, it swells to a great size, and vomiting and constipation ensue. These symptoms are much more frequently happening in this than in the other species of hernia, but at the same time they are generally more easily removed.

Pendulous.

Effects of.

I have never seen the umbilical hernia in the adult but that it contained omentum; the intestine is also often found, and most frequently the colon.

Diagnosis of the intestinal.

The symptoms of uneasiness and sickness above mentioned belong to this hernia when it is intestinal, and this may readily be distinguished from the omental by its great elasticity, by its uniform feel, and by the ease with which the motion of the air and fæces within the hernia may be felt, which produces that gurgling noise which in other kinds of hernia is generally only to be perceived at the time of their reduction.

Diagnosis of the omental.

An umbilical omental hernia produces a tumour, irregular upon its surface, and in which the lobules of fat that compose it, when the hernia is large, may be felt through the skin if it is thin. The feel is also doughy, and the person experiences but little pain, and scarcely any of that uneasy sensation of sinking and irregularity of bowels that distinguish the intestinal hernia. Still, however, a swelling of this kind requires attention, as its increase is sometimes very rapid; for the intestine is very apt to protrude where omentum has once passed, and the omentum itself sometimes becomes strangulated.

Diagnosis when both are contained.

When omentum and intestine are both contained in the sac two tumours are formed in it, which may sometimes be readily distinguished from each other: one of them, which consists of omentum, forms the upper and anterior part of the tumour; the other, which contains the intestine, forms the lower. But if the quantity of omentum is very large, the intestine is so much involved in it that it cannot be very distinctly felt.

Umbilical hernia in infants.

The umbilical hernia is very frequent in the young subject, and forms a tumour like the inflated finger of a glove, with a slight obliquity downwards. It very generally contains intestine, which may be easily returned, unless the orifice is very small, in which case the cries of the child shew that some pain is given. Irregular bowels and costiveness, succeeded by griping and long continued purging, are frequent attendants on this disease.

Fascia.

A fascia* may be distinctly traced over the tumour when the hernia is small, but when it becomes of large size, the skin, sac, and fascia become so united at the anterior part of the swelling, that it is difficult to separate them there, although the fascia may still be distinctly observed on the sides of the tumour.

Varieties.

Figure.

There are some varieties in the umbilical hernia which require to be mentioned. First, with respect to figure, in a thin subject it is generally pyriform, as I have already stated, but in fat persons, in whom the resistance is greater, it forms a broad and flat swelling, which extends as much upwards as downwards. Sometimes, in consequence of there being a large quantity of fat which separates the skin at a great distance from the abdominal muscles, the hernia projects as far as the skin of the navel, and then extends upwards and downwards, so as to form a tumour which is scarcely apparent on a superficial examination. But when the hernia assumes this extended and flattened form in thin persons (which is sometimes the case), it can be embraced by the hand, and its dimensions readily ascertained. I have also seen this umbilical hernia divided into a number of different cells.

Sac.

Besides this variety in the figure of the hernia, there is a great difference in the state of the sac. When this is small, it is as complete as in other herniæ; but I have in my possession an example of the sac having been either absorbed or burst, by which openings have been formed and portions of omentum protruded through them, producing small herniæ through the sac of the large one. Mr. Cliff has made me an excellent drawing of this hernia, from which a plate is given in this work. In this instance two small omental herniæ are seen protruded

* A continuation of the fascia transversalis.

through the hernial sac, and on the opposite side an opening may be observed through which either omentum or intestine might have passed.

In the subject of the plate to which I have alluded, the anterior part of the sac was entirely absorbed, so that the omentum was brought in contact with the skin, to which it firmly adhered, and the skin had been the subject of repeated ulcerations in consequence of the magnitude and weight of the tumour, and of the daily exertions which the woman was obliged to make for her maintenance. As then it is demonstrable, that either by absorption or laceration a portion of the sac may be lost, this will fully account for the apparent absence of the sac altogether, without having recourse to the supposition, that the peritoneum was originally wanting opposite the umbilicus; and, excepting in this instance, and in one which I once saw in the possession of Dr. Marshall, teacher of anatomy in London, I have known no example of this hernia being without a sac. The reasons which have led to a belief of its being generally so, are two:—first, a mistaken idea of the structure of the part, in supposing that the peritoneum was naturally deficient behind the umbilicus; and secondly, the sac being thin and generally adhering firmly to the skin at the anterior part of the tumour.

Sac absorbed or lacerated.

Another and very curious variety, which is in the collection of preparations at St. Thomas's Hospital, was taken from the body of a woman who had been a patient of Mr. Cline's in that hospital, by Mr. Smith. In performing the operation for umbilical hernia, after returning the intestine from the hernial sac, on putting the finger into the abdomen an opening could be felt about half an inch from that by which the finger passed, which led into another tumour by the side of the former. This patient recovered from the operation, but was admitted about twelve months afterwards with the hernia again strangulated. The operation was repeated, and the patient recovered, but she died after five months of another disease, which gave me an opportunity of making a dissection of the two sacs, of which figures are given in the plate of umbilical herniæ; and this case, described by Mr. Smith, is particularly detailed hereafter.

Two sacs.

I have also several times seen, with Mr. Agar, surgeon in Whitechapel, a lady who has two hernial tumours at the umbilicus, one very large, and the other small, a little to the left side of the former.

Of the Causes of Umbilical Hernia.

Pregnancy is the most common cause of this complaint in the adult female. When the gravid uterus rises above the brim of the pelvis it pushes the bowels upwards, and contracts the space which they usually occupy. The origin of this complaint therefore is generally at this period, or, if it had existed before, it is then aggravated. Women often also ascribe this disease to laborious parturition. Another very frequent cause of this complaint is, an extraordinary degree of obesity, which by enlarging the omentum and mesentery renders the abdomen less capable of retaining its contents. When women who have had many children become corpulent, the abdominal muscles being loose and pendulous, render them peculiarly liable to protrusion. From these circumstances it will be seen that women are more subject to umbilical hernia than men.

Pregnancy.

Obesity.

We often see during ascites the umbilicus projecting, the skin thin, and a fluid evidently contained within it, and sometimes the water has been discharged by puncturing it with a lancet. I believe, however, that generally this is rather the consequence than the cause of hernia. Mr. Warner, formerly surgeon of Guy's Hospital, and author of several surgical tracts and cases, gives an account of a hernia being produced by puncturing the navel in dropsy, which is a valid objection against tapping the abdomen either at the navel or above it, both because it may lay the foundation of hernia, and because it is possible that a portion of intestine may adhere to the umbilicus, which would be wounded by the puncture.

Ascites.

Children, however, are most frequently the subjects of this complaint, and in them it appears very soon after birth, as the opening for the passage of the umbilical cord into the abdomen is at that time large, and will readily allow of the escape of the intestine. This complaint is more frequent in some families than in others, and I am disposed to attribute it to the size of the funis, as I know an instance of three children in the same family who have this disease, and in whom at birth the funis was larger than usual.

Large funis.

Children are sometimes born with a deficiency of the abdominal muscles at the umbilical aperture, which gives rise to a large protrusion, a little on one side of which is the funis, and the covering is so thin that the intestines may be seen through it. The edges of the skin surrounding the tumour are of a red colour, and somewhat thickened and retracted. On this subject I have received a very valuable communication from Dr. Hamilton, professor of midwifery in the University of Edinburgh.

Abdominal muscles deficient.

Case.

My dear Sir,

It affords me great pleasure to have it in my power to communicate any information either to your good self, or to my old fellow-student, Mr. Astley Cooper.

The case to which he alludes occurred about the 14th of July, 1804. It was the smallest congenite umbilical hernia, or what we call ventral tumour, I had ever met with, for its size did not exceed that of a large hen's egg. And the deficiency of abdominal parietes could have been covered by a half crown piece. The edges of the teguments of the abdomen surrounding the base of the tumour were, as I have always observed in such cases, thickened and somewhat retracted, and of a deep pink colour. The tumour itself was not nearly so transparent as I have usually found it, but the navel string terminated as it ordinarily does in similar cases, that is a little to one side, and not on the apex.

On examining accurately the appearances, it occurred to me that the protruded contents might be reduced, and that the edges of the defective parts might be brought together. I therefore immediately sent for my friend Mr. James Anderson, surgeon, and requested his assistance in the operation.

After a little difficulty the contents of the sac were reduced, a ligature was then tied firmly round its base, after which the sac was cautiously opened. It proved to be the sheath of the umbilical cord. With two silver pins and some adhesive straps the edges of the separated parietes abdominis were brought closely together. The sac was allowed to drop off, and in a few days the cure was complete.

To Dr. Barclay, Teacher of Anatomy, in Edinburgh.

Fleshy tumour at the navel.

A small tumour sometimes projects from the navel of children, which surgeons have mistaken for hernia. It hangs in the hollow of the navel, is of a florid red colour, and is attached by a small neck.

The first case of this kind which I saw was brought to me from the neighbourhood of Sittingbourne, in Kent. The child was seven years old, and during the four first years of its life it had a discharge from the navel, and the funis, which had sloughed further from the navel than usual, had never healed. A small red and fungous tumour then appeared which bled frequently, and at other times discharged a bloody serum, and was painful when irritated by exercise. On examining this substance, I found it arose from the circumstance of the funis being so long as to project beyond the skin of the navel, which prevented cicatrization. I made a ligature around it, which gave the child scarcely any pain, and on the following day I removed it with scissars.

I have seen another case of a similar kind.

CHAPTER II.

Of the Reducible and Irreducible Umbilical Hernia.

Position for reduction.

WHEN the attempt is made to return the intestine into the cavity of the abdomen, particular attention must be paid to relax the abdominal muscles. For this purpose the shoulders must be elevated, the pelvis raised, and the thighs brought at right angles with the body. This position gives the greatest possible room for the return of the intestine.

Taxis.

In making the reduction the surgeon grasps the tumour in his hands and directs it upwards, as the opening which leads from the swelling into the abdomen is not directly in the centre of the tumour, but a little above it, and he then kneads the neck of the tumour with the finger and thumb of the other hand; but if the swelling is small and projects only from the abdominal muscles to the navel without spreading on each side, a direct pressure may be made upon the surface of the tumour with the thumbs, so as to force it into the cavity of the abdomen.

Case.

I was requested to see a patient of Mr. Brickenden's, aged sixty-one, whose symptoms of strangulation began the morning before I visited her, and she had continued vomiting until four o'clock the following day, and had had no stool. The swelling was reduced in five minutes by pressing my hand firmly upon it.

The most difficult species of umbilical hernia to reduce, is that which lies between the skin and abdominal muscles imbedded in fat, and scarcely projecting the integuments; for this tumour cannot easily be grasped in the hands, and all that can be done is to bring its sides together as closely as possible by a general pressure over the contiguous part of the abdomen.

Truss.

When the hernia is returned some kind of bandage must be applied, and the one that I prefer for a hernia of small size is a spring truss, made exactly on the same principle as the truss for inguinal hernia. A small

circular pad is made to press upon the navel, and the steel spring reaches from this point round to the back a little further than the spine, and the circle is completed by a strap which buckles upon the pad. In taking measure for this truss nothing more is necessary than to take the girth of the abdomen at the level of the navel. This simple bandage I have found to answer all the purpose of the most complicated, and it has the additional advantage of taking up so little room as to be easily concealed.

If the navel is very deep, owing to great corpulency, I generally order an ivory ball, from half an inch to an inch and a half in diameter (according to the size of the tumour), to be cut in half, and this to be first put into the navel and kept in its situation, by applying the pad of the truss over it. The more common method of making pressure, when the navel is very hollow, is to unite a small cushion to the pad, which is to fill the hollow; but as the common exertions of the body will cause a slight motion in the pad, the cushion slips out of the navel, and the hernia is liable to pass down by its side. Whereas, if the ivory ball is introduced in the way mentioned, a slight variation in the position of the truss will not displace the ball. Ball.

Some corpulent persons are so much inconvenienced by the pressure of a truss or belt that I have occasionally had recourse to the following plan: a section of an ivory ball having been adapted to the protrusion, is secured by a piece of plaster (about the size of the palm of the hand), composed of equal parts of empl: thuris comp.; and empl: saponis, over which a larger piece of the same plaster, about eight inches square, is placed. This contrivance can often be borne when other means of support have failed.

Very large herniæ, especially if they are accompanied by a pendulous belly, require a truss which exerts a more extended pressure on the abdomen. For this purpose very broad thin pads are applied, which by both keeping back the hernia and giving support to the abdomen, afford great comfort to the patient's feelings. Large hernia.

A truss of this kind is represented in the plate of umbilical hernia, and together with it is a very ingenious one for the same purpose, invented by Mr. Morrison, of Leeds, in which the pad is supported by a spring extending from the arm of the truss, and which he considers as an improvement upon that which is delineated in Mr. Hey's work. When the umbilical hernia is small, it may sometimes be kept up, and finally cured by the following method:—A small circular piece of adhesive plaster is laid on the navel (after reduction), over which are placed successive circles of plaster, gradually increasing in diameter, so as to form a solid cone, with the apex inwards, till the navel is quite filled, after which a large piece of plaster is fixed over the whole. A medical man who had a hernia after ascites, informed me that he had cured himself by this method of treatment. Adhesive plasters.

With regard to the umbilical hernia of children, if they are not very young, a truss like that for the adult may be employed; but if they are quite infants, the plan which I have found the most effectual is the following:—a small section of an ivory ball is laid on the navel; over this is to be applied a piece of adhesive plaster of the size of the palm of the hand, and a linen belt over the whole round the abdomen. As soon as the child begins to walk two thigh straps are to be added to the bottom of the belt to prevent it from slipping. If this application be carefully persisted in for a length of time, the cure of this disease is very sure to be effected. Infantile hernia.

It has been recommended by some foreign surgeons in the umbilical hernia of children, to press the intestine carefully into the cavity of the abdomen, and then to make a ligature round the root of the hernia, and to leave both the integuments and sac to slough. But although this operation may be with safety performed, yet it is not entirely destitute of danger, both from inflammation of the sac and injury to the intestine, and it is so very painful and violent, that in my opinion, it ought not to be performed. Besides, even after the operation, it is necessary to have recourse to the same pressure to prevent a relapse which is employed to produce a cure. Tying the tumour.

In those cases in which from an original deficiency of the linea alba around the umbilical aperture a hernia forms in the funis of the child, it is right, after reducing the intestine, to place a small piece of linen upon the navel, to bring the sides of the aperture together by pieces of adhesive plaster, to place a pad of linen over the part, and a belt, which is to go around the abdomen, over the whole. Fœtal hernia.

In the year 1814, a lady requested me to see her infant on the day after its birth, on account of a protrusion at the umbilicus, the surface of which appeared like peritoneum; the tumour was of a dark red colour, and was very sensitive when touched. I ordered the lot: hydr: cin: to be applied to the surface, over which a piece of oiled linen and a belt were fastened. The surface of the tumour sloughed; it soon began to granulate, and in a few days it was entirely healed.

Of Irreducible Umbilical Hernia.

The same causes which render inguinal hernia irreducible generally operate here. Of these the most frequent is adhesion of the omentum; and sometimes of the intestine. An extraordinary growth of the omentum, the Causes of.

mesentery, and the appendices epiploicæ, will render the hernia irreducible even without adhesion. Sometimes, too, this may be brought about by the hernial sac giving way at some part, and allowing the omentum to pass through the opening, where it remains confined, as I have already explained.

Size enormous.

The irreducible umbilical hernia sometimes grows to an enormous size in women whose bellies are pendulous from bearing a great number of children. In three such instances, I have seen the hernia extending so low from the navel as entirely to cover the pudendum. One example which Dr. Pole, of Bristol, took from the body of a patient, measured ten inches in length, and eight in breadth at the upper part, and seven at the lower. The largest I have ever seen was in a patient of Mr. Gaselee; the tumour measured across twenty inches by seventeen. In such cases, however, the umbilicus cannot remain at its usual distance from the pubes, but from the constant weight of the hernia the opening is brought considerably lower. I subjoin a case of this description from the authority of the late Sir David Dundas, Serjeant Surgeon to his Majesty.

Ulceration of.

A tumour of such uncommon magnitude produces so much inconvenience as almost to unfit the sufferer for any exertion. This happens partly from the excessive weight of the tumour, and partly from ulceration of the integuments, which frequently occurs, and which is extremely difficult to heal, and often impracticable without confining the patient to a recumbent posture. Specimens of ulcerated integuments will be seen in the first of the two plates which illustrate umbilical hernia.

Danger of.

This state of enormous tumefaction also exposes the person to considerable hazard from blows or falls, which endanger the bursting of the intestine; an accident that is certainly and speedily fatal.

Richmond, October 25, 1805.

Dear Sir,

Case.

I was sent for on Tuesday to a woman, about sixty and very fat, who had an umbilical hernia for near thirty years, of a monstrous size, and which had been in a state of strangulation for three days. After much perseverance, I succeeded in returning the whole into the abdomen, and the opening through the umbilicus was so wide, that I could push my four fingers and thumb into it.

The poor woman was for twelve hours apparently better, the vomiting ceased, and she had a stool; but, like our patient last year at Teddington, her pulse continued very quick, her weakness increased, and her pain diminished.

In the course of the evening, notwithstanding my attempts to retain it, the hernia returned as large as ever, and she died yesterday morning.

I meant to have removed the integuments and the sac as well as the umbilicus, but both were so completely sphacelated, it was impracticable; almost all the bowels contained in the sac (as much as would fill a hat) were mortified.

I removed the umbilicus, which is so wide, that one would think it would have been impossible for it to have occasioned a strangulation of the bowels; but the quantity protruded made it produce the same effect as a narrower passage would have done.

I have sent the umbilicus to you in its rude state, as you may, perhaps, not dislike to see its extraordinary appearance.

I apprehend mortification of the bowels had taken place before I reduced them; perhaps that was the case with Mrs. D.

I remain, Sir, with great regard,

Your obedient humble Servant,

DAVID DUNDAS.

Sir David Dundas here refers to the following case of a lady at Teddington, in whom I partially returned an umbilical hernia, but without relief of the symptoms.

Case.

Mrs. Davis, aged sixty-four, who had long been the subject of umbilical hernia, was seized on Tuesday, the 20th of November, 1804, with pain and increase of the swelling.

On Wednesday the 21st, after taking some ol. ricini she was sick, and she had no stool this day.

On Thursday she vomited again once; the tumour was more tense, and she had no stool. On this and the preceding day she had considerable abdominal pain.

On Friday she was easier, but still she had no stool.

On Saturday I saw her about three o'clock in the afternoon. I found the tumour tense, but the belly but little swelled; she had no stool; little pain in the part when handled. After pressing on the tumour about twenty minutes the largest part of it suddenly returned, and it became, as she herself stated, as soft as it usually was, and she had a small stool: still a portion of omentum could be felt in the tumour which could not be effectually returned; and as so large a part of the contents had gone back, it was not thought likely that the omentum could suffer much from pressure from the orifice of the sac; nor was her state such as could admit of an operation. Her pulse was 130, and extremely low; her tongue covered with a brown fur; and a general depression about her which strongly indicated that she had not long to live: so that if it was certain that the omentum was still strangulated, it must have remained so.

On Sunday I again saw her, and found the abdomen tense, and much more swollen than the day before; very tender when touched; she had no stool, but had not been sick; she seemed to be dying, as her pulse was scarcely perceptible; and she died in the evening.

Sir David Dundas, of Richmond, who with his son opened the body, found a considerable piece of intestine mortified, or at least highly inflamed, but within the abdomen; and a large portion of omentum in the sac, red and discoloured; the stricture round which was still so considerable, as to make it difficult to pass in the finger so as to divide it.

Suppuration now and then takes place in the omentum of an irreducible umbilical hernia. An account of a case of this kind is given in the former part, of a woman who had three herniæ, one of which was umbilical, and in the sac, which contained the omentum, was found about half an ounce of pus. Suppuration of.

When the hernia is evidently become irreducible a hollow truss should be applied to prevent its increase. For this purpose it should be made in the form of the inner part of a saucer, but with its edges a little rounded to prevent any painful pressure on the abdomen, and with a spring attached to each side. Thus constructed it may be worn with as little inconvenience as a common truss. The material of the pad may be tin covered with leather. A lady whom I saw, and to whom expense was no object, had it made of silver, which is the best material, as this metal will not, like tin, be rusted by the perspiration with which the leather is always imbued. Hollow truss.

When the irreducible hernia has grown very large no truss can be worn, and in this uncomfortable situation all that can be done is to carry a broad belt under the tumour, which being crossed round the shoulders, will take off a part of the weight with which the sufferer is encumbered. Large herniæ supported by a belt.

CHAPTER III.

Of the Strangulated Umbilical Hernia.

THE symptoms of strangulation are generally less urgent in this than in the inguinal or crural hernia, but as they do not, in other respects, materially differ from those which have been mentioned in the descriptions of those herniæ, it will be unnecessary to repeat them in this place. There is one circumstance of danger, however, which is peculiar to the umbilical hernia, which is that when the skin has become very thin over the tumour, the pressure simply of the protruded parts, under strangulation, will sometimes very early destroy the life of that portion of integument by stopping the circulation through it. It first turns green, the cuticle then separates from it, and that portion of skin becomes dry and of a brown colour, and in the instances in which this circumstance came under my observation the patients have died. Symptoms.

The following case I attended with Mr. Platt, who has afforded me the following account.

Case of Umbilical Hernia, in which the Intestine was Mortified.

On Thursday, August 31, 1819, I was requested to see Mrs. Worldridge, aged forty-seven, who had laboured under an umbilical hernia for some years. She complained of pain and uneasiness about the umbilical region, imitating, as she expressed it, colicky pains. As the bowels had been relieved in the morning I prescribed small doses of rhubarb, with the tincture of opium and cardamoms. In the evening the pains were aggravated. An enema was administered, and the abdomen fomented with the poppy and chamomile fomentation, but it produced no mitigation of her sufferings. Case.

September 1. No intestinal evacuation, and scarcely any remission of pain. Large doses of extractum colocynthidis compositum, with the hydrargyri submuriæ were exhibited. The enema and fomentation were likewise repeated, but without any sensible effect.

September 2. The cathartic pills and enema were successfully repeated, as several copious evacuations were procured this morning.

Sunday, September 3. Quick and feeble pulse; frequent retchings, and no remission from pain; the abdomen very tense, forming a very considerable projection round the umbilicus. On Sunday evening I had the satisfaction of meeting Mr. Astley Cooper, when the following appearances presented themselves:—the protrusion about the umbilical region assumed a dark and livid hue; from this gangrenous surface a very slight discharge had issued; the pulse more quick and feeble than in the morning; an occasional hiccough, with a constant inclination to nausea. The symptoms of strangulation and approaching sphacelus were such that Mr. Cooper, was of opinion that little advantage would be derived from an operation, and proposed an opiate pill, combined with a small quantity of hydrargyri submuriæ. The inflamed parts to be kept constantly moistened with a lotion composed of one part of the liquor ammoniæ acetatis, and four parts of water.

September 4. The pills and lotion were repeated. No material alteration.

September 6. The parts surrounding the umbilicus are now highly gangrenous, and the line of demarcation between the living and the dead portions is distinctly observable. The process of ulceration has produced an aperture about half an inch below the umbilicus, from which issues a fætid discharge.

September 7. The discharge increases, which resembles fæces both in smell and colour. An hæmorrhage, apparently from the ruptured vessels of the protruded intestine, has been troublesome to day, but which in the evening ceased spontaneously.

September 9. A complete separation has taken place between the gangrenous and living parts.

September 12. The parts in the vicinity of the umbilicus are much inflamed. The greater part of the faecal matter seems to pass through this artificial anus. Within these last two or three days the appetite has improved, and she has acquired additional strength.

September 14. No evacuation per anum, but a continual discharge from the umbilical aperture.

September 16. Another small aperture from the right side of the umbilicus has presented itself, from which issues an offensive discharge resembling faeces.

September 17. A considerable hæmorrhage from this last aperture. Large portions of the gangrenous parts are continually separating, and the granulations assume a florid and healthy appearance.

September 20. Mr. Cooper removed a considerable portion of the sphacelated part. The convolutions of the intestines were very distinctly discernable; and what very rarely admits of ocular demonstration, the peristaltic motion of the intestines could be distinctly observed.

September 22. Discharge of faecal matter and a slight hæmorrhage from the aperture on the right side of the umbilicus. The opening in the direction of the linea alba being nearly closed.

September 24. Nearly the whole of the faeces seem to pass through the lateral aperture.

September 26. Takes more nourishment, and is apparently stronger. Passes the nights tolerably well, and free from delirium.

September 28. The whole of the faeces have escaped through the lateral aperture; no evacuation having taken place per anum for several days. The granulations were luxuriant and healthy, and a considerable portion completely cicatrized.

September 30. She had passed a good night. The cicatrization had advanced rapidly, and nature seemed to be prosecuting her operations with every prospect of success: but about the middle of the day unfavourable symptoms arose; she became incoherent; pulse feeble and fluttering; the powers of nature were gradually exhausted, and between seven and eight in the evening she expired.

Time in which it
proves fatal.

The time in which strangulated umbilical hernia proves fatal varies considerably. The earliest period from the accession of the symptoms at which I have known death to happen was seventeen hours and a half. In general when death is late, the hernia consists chiefly of omentum, and sometimes (though very rarely) entirely so.

Cause of.

The most frequent cause of strangulation is indiscretion, both in the quantity and quality of food, so that persons subject to this complaint should eat rather sparingly at any one time, and should avoid every thing that tends to flatulency. This last circumstance seems to be confirmed by the observation which has been made, that cases of strangulated hernia are more common in the season when green vegetables are most abundant. Meat of an indigestible kind is to be equally avoided, as it passes through the greater part of the intestinal canal undissolved, as I have observed in cases of artificial anus, when a large quantity of ham, or fat, had been taken.

Case.

Mary Harris, aged sixty years, who lived at No. 3, Bryant Street, Webb Square, Shoreditch, had an umbilical hernia for twenty years, the origin of which she attributed to parturition. The hernia became of very large size, and four years before her death the skin ulcerated; the sores were difficult to cure, but did not remain healed for any length of time.

Symptoms of strangulation began in this hernia on July the 21st, 1805, soon after a hearty dinner of beans and bacon. She had a continued inclination to go to stool, but could not evacuate; and then began to vomit every thing she swallowed. She complained of excessive pain in the stomach, and in the hernia.

Mr. Weston was called to her. Calomel and cathartic extract, magnesia vitriolata, and infusion of senna were given without advantage; clysters were also injected, and fomentations applied to the abdomen, without diminishing the urgency of the symptoms.

At ten o'clock at night of the 23d, in getting out of bed, she fell forwards upon the floor; her husband ran up stairs to help her, but she complained of violent pain, and refused to be removed from the place on which she was lying; she was, therefore, covered with the bed-clothes and suffered to remain upon the spot, and after a few minutes she died.

INSPECTION.

Upon opening the abdomen, the intestines appeared but slightly inflamed, and there was no effusion into this cavity, but the bowels were extremely inflated.

Cutting open the tumour, the intestine was burst in two places, so that the faeces had escaped into the hernial sac, and in one part the inner coat of the intestine was burst without any rupture of the external peritoneal covering.

The hernial sac was absorbed at the place at which the ulcers in the integuments had existed, and to this part the omentum adhered with a degree of firmness, which made it impossible to separate it. The hernial sac had given way in two different places on the left side, and in one on the right, and through each of these holes the omentum had passed, so as to form two small herniæ between the sac and the skin.

The strangulation still remained complete at the umbilical ring. See plate.

Seat of.

The seat of strangulation is in the edge of the tendon forming the linea alba, which forms the umbilical aperture, and which always becomes extremely thickened, so that in the operation I have felt it resisting the knife like cartilage. The sac also is thicker in this part than elsewhere, and sometimes prevents the return of the protruded parts.

Strangulation, however, may also arise from a hole in the sac itself through which a part of the hernia will protrude, as will be seen in the following case.

Mrs. Marshall, aged forty-eight, who resided in Prescott-street, Goodman's-fields, and who had a very large irreducible umbilical hernia, at six o'clock in the afternoon of the 21st of August, 1806, was seized with symptoms of strangulation. She sent for Mr. White, surgeon, in the New-road, who reached her house by seven o'clock, and, after giving her a purgative medicine, came for me. It was ten o'clock at night before I saw her; the tumour was then very hard and large; and before I made any attempt to reduce it, I ordered a drachm of tobacco to be infused in a pint of water, and half to be injected. When this had been done a quarter of an hour, I made an attempt to reduce part of the swelling, but it was unsuccessful. The other half of the tobacco enema was then thrown up, and at the same time five grains of calomel and two of opium were given; after which another attempt was made to reduce the hernia, but unsuccessfully. Indeed, the swelling was so tender to the touch, her cries were so violent at each attempt, and she made such resistance to every trial, that it was impossible to persevere sufficiently to give a chance of success.

Case.

She passed the night in dreadful agony, disturbing not only the persons in the house but the neighbours with her cries, and scarcely five minutes elapsed without her vomiting; in short, I never observed in any person the symptoms so violent.

August 22, I called upon her at half-past seven in the morning, and found mortification had begun in the skin over the tumour, where the umbilicus had been originally placed; the skin there seemed to be particularly thin; it had changed to a green colour, but the cuticle had not separated. All the other symptoms were the same, except that her cries were not so loud and piercing, for she seemed already beginning to sink. Under these circumstances there appeared no chance of saving her life by an operation; a very slight mention of which excited the utmost horror in her mind. I therefore merely ordered fomentations to the part, and opium internally.

Mr. White informed me she continued in great pain after I quitted her in the morning; she vomited frequently, and was occasionally delirious; that about eleven o'clock she brought up, with a slight effort, a large quantity of coffee-coloured fluid; that she afterwards became extremely feeble, and at half-past eleven o'clock she expired.

Dr. Babington had been sent for, but she died before he reached the house. She lived only seventeen hours and a half after the strangulation began.

DISSECTION.

Upon opening the tumour, it was found to contain a very large portion of colon; and opposite the umbilicus, where the mortification in the skin had appeared, there was a little pouch protruding from the general cavity of the sac, in which a separate portion of the colon had been strangulated, and had there undergone a much greater change of colour than that in the larger portion of the bag.

Several small pouches were found in the side of the sac at different parts, and the whole tumour bore much resemblance to the shape of a melon.

The intestine adhered generally to the inner side of the sac; the quantity which had descended was so large, and the time which it required in the dead body to return it into the cavity of the abdomen was such, that I am perfectly satisfied that the operation could not have been performed at any time with hopes of success, if the hernial sac had been opened in the usual manner.

With regard to the treatment of strangulated umbilical hernia, the first object is to attempt the reduction by the taxis, for which purpose the patient is to be placed in the relaxed position already described, and a gentle and uniform pressure is to be kept up for half an hour or more.

Treatment.

When the simple taxis had previously failed, I have known instances in which it has succeeded, after having given large doses of calomel (ten grains, for example, for an adult), combined with a grain of opium, followed up with magnesia vitriolata and infusion of roses; and if the skin is inflamed, drawing away some blood by leeches. The remedy, however, on which I place the greatest reliance, and which I have found more successful here than in any other species of hernia, is the tobacco clyster, employed with the same precautions as have been detailed at large in the first part of this work. I attended a lady with Mr. Toulmin, of Hackney, who laboured under severe symptoms of strangulation from umbilical hernia, in which the tumour was very tense, and where all previous attempts at reduction by the hand had failed. In twenty minutes after the tobacco enema had been thrown up, faintness came on, the tumour became quite flaccid, and with slight pressure the hernia returned into the cavity of the abdomen. I saw a patient of Mr. Hammond's, at Southgate, thus quickly relieved after a strangulation of forty-eight hours continuance; and a person who came to my house informed me, that she had been repeatedly relieved of the symptoms of strangulation by this clyster.

Medicine.

Tobacco clyster.

If the symptoms of strangulation do not yield to the tobacco clyster and continue urgent, the effect of cold may be tried, either by inclosing ice in a bladder and letting it remain on the part, or (what has been also found successful) by dashing cold water repeatedly on the naked belly; but, if the vomiting is frequent, much time must not be spent in these attempts.

Cold.

A corpulent woman of the name of Hervey, aged fifty-two, was admitted into Guy's Hospital labouring under strangulated umbilical hernia. She had been troubled with the hernia for seven years. Strangulation had existed for five days previous to her admission, since which she had continual vomiting and no stool had passed: what she brought up from her stomach was of a feculent character. She was put into the warm bath, and bled ad deliquium; three half pints of tobacco infusion were at intervals injected and ice applied to the tumour. On the following morning a portion of the tumour became reduced, and stools were freely procured.

Case.

Mrs. B——, a patient of Messrs. Jourdan and Castle, Bermondsey-street, was seized on the 20th of January with pain at the navel, which continued on the 21st, when, of her own accord, she took an opening medicine, which succeeded in procuring some

Case.

stools. The pain, however, still continuing at the navel, and being attended with sickness and pain in the stomach, on the 22nd she sent for Mr Jourdan.

He found a tumour at the navel, about the size of a pullet's egg, which was very tender to the touch, and resisted every attempt to return it into the abdomen. He took away blood from the arm, applied leeches to the swelling, which relieved her with respect to the pain she had suffered, but still she vomited once on this day.

On the 23rd, as her bowels were constipated, Mr. Jourdan ordered her some opening medicine, which procured several evacuations.

24th. I was sent for; the tumour was still of the same size, very tender to the touch and very hard, entirely free from elasticity, rather knotted on its surface, did not project the integument, but was imbedded in the fat between the muscles and the skin. It had the feel of omental hernia. She said, that upon the whole, she was in less pain since Mr. Jourdan bled her and applied the leeches. I ordered ice, inclosed in a bladder, to be applied to the tumour, and the purgative medicine to be continued.

25th. She has had stools; the part is not so sore to the touch, but the tumour is very hard. Upon the whole she thinks herself better.

27th. I was informed that she was better, and that she continued the ice and purgative medicine.

28th. I saw her, and the swelling was much reduced. Its tenderness has ceased; her bowels are regular.

February 3rd. The tumour is almost entirely reduced, and she is doing well.

If the patient is plethoric, blood should be taken from the arm; but as the subjects of this disease are generally women of relaxed fibre, I have seldom found venesection advisable.

Omental hernia.

In strangulated omental hernia, after all attempts at reduction had failed by the taxis, I have seen the omentum gradually reduced by bleeding from the arm, applying leeches, and afterwards a bladder containing ice and water.

Two sacs.

As there are sometimes two hernial sacs involved in the same tumour, care should be taken that no deception arises from reducing the larger alone, whilst the other remains strangulated. In a case of this kind that occurred to me, with Mr. Agar, in Whitechapel, I found that on compressing the larger swelling, the air and fluid in the intestine could be felt returning into the abdomen with a gurgling noise, after which a smaller tumour was felt on the left side of the larger, the contents of which were strangulated, and which remained irreducible till the tobacco clyster had been employed.

Case.

Mrs. ———, about sixteen years ago, whilst getting over a stile, felt something crack above the navel, being then in the fifth month of pregnancy. An umbilical hernia was the consequence, which, in the succeeding years, increased very considerably, without however producing any particular indisposition: it was during this period confined with an elastic truss in the day, which at night was usually laid aside. Of late, however, a smaller tumour has been formed near to the left side of the larger, and it is this which has occasioned the following symptoms.

On January 9, 1805, the patient was seized about eleven at night with a violent pain about the navel, and the other symptoms of strangulated hernia. Ten grains of calomel, with one of opium, were immediately given, without however affording relief; and at six in the morning two opening pills were taken, but soon returned by vomiting, and a cathartic clyster was almost instantly rejected. The symptoms continuing, about six in the evening, by the advice of Mr. Astley Cooper, the calomel and opium were repeated; and half an hour afterwards a clyster of half a drachm of tobacco, infused in half a pint of water, was administered, which produced the usual depressing effects, and in a few minutes procured relief, so that nothing farther was required but keeping the bowels open, by giving of Rochelle salts occasionally.

On the 19th the symptoms returned, and early on the following morning rapidly increased, when Mr. Cooper recommended the calomel and opium pills, and tobacco clyster to be repeated; by which plan immediate relief was obtained.

April 20, 1806, the patient was attacked with heartburn, which was soon followed by pain and vomiting; but the pain was not now incessant, as it had been on the former occasions, experiencing sometimes intervals of a quarter of an hour. Two days previous to this she had taken two opening pills, to which she had occasionally had recourse for twenty years past, without any unpleasant consequence, and generally with the desired effect; but in this instance they operated very violently. Mr. Cooper recommended a repetition of the calomel and opium pills, the application of leeches, with fomentation to the part affected, and the use of Rochelle salts occasionally, which effectually removed the complaint.

On the night of December 2nd, the patient in a violent fit of coughing felt something pass through the part, which soon produced pain and sickness. The calomel pills with opium were given, and the protrusion in some degree returned; but she had some sleep from twelve till towards six in the morning, when the cough brought on a return of the rupture, with more violent vomiting than the patient had ever experienced before. About eight, Mr. Cooper arriving, advised the calomel pills with opium to be repeated, and a tobacco clyster administered, which instantly returned; and, as the symptoms increased, in about an hour a second clyster was tried, which soon procured the desired relief. Since that time the Rochelle salts have been occasionally taken; but the patient experienced more debility than after any former attack. The calomel also in this instance produced a troublesome salivation.

This was a case of double umbilical hernia. The larger contained both omentum and intestine, for the lobules of fat in the former could be readily felt, and the gurgling noise in the latter be easily heard. The larger I could partially return after a few moments pressure; but upon the smaller I could make no impression until the calomel and opium had been given, and a tobacco clyster administered.

Of the Operation for Umbilical Hernia.

If this hernia is not of considerable size, and if the parts do not adhere, the operation is very simple: an incision is made from the upper to the lower part of the tumour, which must be performed with caution to avoid wounding the intestine, as when large it is not always covered by a sac, and when it is, the sac is extremely thin. The sac is then to be divided by a small opening, a quantity of fluid escapes, and the contents of the hernia are exposed, of which, if both omentum and intestine are present, the omentum first appears, and on turning it aside the intestine is found behind, and in some degree involved in it. When the opening is sufficiently dilated by the director, the finger is to be gently introduced at the upper part of the intestine between it and the omentum, and directed to the orifice of the umbilicus, which is thus easily found. The omentum being then drawn aside, a probe-pointed bistoury is to be carried upon the finger, and the linea alba divided towards the sternum to an extent proportioned to the size of the parts which have descended, so as to allow of their return without using more than gentle force. In most instances dilatation from half an inch to an inch will be sufficient.

Small hernia.

Dilatation upwards.

The intestine is first to be returned if in a state to admit of it, after which the omentum is to be either cut away or returned according to the state in which it is found, and the integuments brought together by suture.

The operation which I have just described is easily performed, and is that which is generally employed; but it is one which exposes the patient to the risk of peritoneal inflammation, in consequence of a direct opening being left through the integuments into the cavity of the abdomen. I have, therefore, in some instances performed the following operation. As the opening into the abdomen is placed towards the upper part of the tumour, I began the incision a little below it, that is, at the middle of the swelling, and extended it to its lowest part. I then made a second incision at the upper part of the first, and at right angles with it, so that the double incision was in the form of the letter T, the top of which crossed the middle of the tumour. The integument being thus divided, the angles of the incision were turned down, which exposed a considerable portion of the hernial sac. This being then carefully opened, the finger was passed below the intestine to the orifice of the sac at the umbilicus, and the probe-pointed bistoury being introduced upon it, I directed it into the opening at the navel, and divided the linea alba *downwards* to the requisite degree, instead of *upwards*, as in the former operation.

Dilatation downwards.

Mrs. Culf, of Tottenham High Cross, had long laboured under a large umbilical hernia, which became strangulated at three in the morning of the 17th of September, 1801, and the symptoms continued undiminished till seven in the morning of the 18th, when Mr. Holmes, of Tottenham, her Surgeon, requested me to see her. I found her vomiting violently; incapable of having a stool, and with frequent eructations, and excessive pain across the middle of the abdomen, which came on by paroxysms, at the interval of about ten minutes, and the belly was very much swollen. The tumour, which could be distinctly felt to be in part omentum and partly intestine, was not equally tense with the abdomen, which I attributed to the large quantity of omentum which had descended.

Case.

As there was no hope of preserving her life, but by an operation (and, indeed, from her extraordinary bulk, even this was attended with much danger), I instantly proposed it, to which she very readily consented.

The first incision was made across the middle of the tumour, and the second at right angles with it at its lower part; and after dividing the hernial sac in the same direction, eight inches of the arch of the colon, and a large portion of omentum became exposed. I removed the stricture by cutting the linea alba towards the pubes, for which purpose an incision of an inch in extent was required. The intestine was then easily returned into the abdomen, but the omentum I left in the hernial sac; and having brought the edges of the wound together over it, I laid an adhesive plaster upon the part. She became easy immediately after the operation, and when I left her, was disposed to sleep.

19th.—She was hot and restless the whole of yesterday, and had a restless night; she has had no sickness, but has passed a great number of very liquid stools; her menses, which were discharging the day preceding the accession of the symptoms, still continue; her pulse is 140 and fluttering; the abdomen swollen and tense. I bled her to the amount of six ounces; ordered the navel to be fomented and poulticed, as there appeared a disposition to gangrene about the edges of the wound.

20th.—She was better, being less restless, continuing to have stools, and to menstruate; the belly was less tense, and the gangrenous appearance had somewhat subsided, but her pulse was still 120, and weak; I therefore ordered her to take nourishment.

21st.—I found her low, but her pulse was not so quick; the menstrual discharge continues, and she has had one stool; the tumour, however, is tense, and one of its edges is sloughy.

24th.—Her health continued to improve until to day, when I found her complaining of pain in her head and giddiness. She was also hot, and her pulse was quick. I opened the wound a little, the edges of which were slightly gangrenous; and I found the omentum which I had left in the sac in a sloughy state. I ordered bark, wine and water, and a nourishing diet.

26th.—She is much improved in health; but the omentum continues to slough. A poultice is the only application, and which she says is productive of great ease.

29th.—Her health is improving, but the omentum continues to slough, and keeps up a great discharge.

As she resided five miles from town, I did not see her afterwards but at distant intervals; the omentum did not entirely separate until the end of the month of April, and she was not perfectly cured until the middle of May.

When the omentum and intestine are returned, the portions of integument and sac which are left at the upper part undivided fall over the opening at the umbilicus, cover it and unite to its edge, and thus lessen the risk of peritoneal inflammation by more readily closing the wound.

Large herniæ.

Sac unopened.

I have mentioned in the former part of this work the advantage which is derived in large herniæ*, from dividing the stricture, when formed by the surrounding tendon only, without opening the hernial sac itself. In the following case the tumour was very large, and had been irreducible for many years. A portion of intestine descended into it, and it became strangulated. I was called to her, and advised the operation, as many hours had already elapsed since the symptoms commenced, and several unsuccessful attempts had been made to return it. I made a very small incision opposite the neck of the tumour, exposed the fascia which covered it, passed my probe-pointed bistoury between the fascia and the sac, and divided the former to the edge of the umbilical ring; then putting my finger to the edge of the linea alba, I passed my knife through the umbilical hole behind the linea alba and made a small division of it upwards; then, withdrawing the knife, I pressed upon the tumour, and it immediately returned. This operation did not take more than four minutes in its performance; it is attended with no more danger than the taxis; and, if insufficient, the operation may be afterwards performed in the common way by extending the same incision.

Case.

February 5, 1807.—I was called by Mr. Shannon to see Mrs. Aaron, aged fifty-two years, who had symptoms of strangulated hernia. She had long had an irreducible omental exomphalos, of the form of a melon, for which a hollow truss had been worn; the pad of which was formed of pewter, and covered with leather. For a month prior to this period she had a very violent cough, with difficulty of breathing, and in a fit of coughing on January the 31st, felt the tumour become tense, with violent pain in the abdomen, constipation of the bowels and sickness. On February the 2d, however, she had several motions, but on the 3d, was in much greater pain and vomited frequently, which continued on the 4th and 5th.

As the symptoms had continued so long, and I could make no impression on the swelling by the taxis, I proposed the operation, to which she immediately consented, and it was performed at one o'clock, P. M. in the following manner.

I directed Mr. Shannon to draw down the tumour towards the pubes, and then made an incision two inches long through the skin only, opposite to the upper part of the neck of the hernial sac. This incision exposed a fascia, into which I next made an opening large enough to admit a director, which was carried to the aperture at the umbilicus and cut upon.

I then passed my finger between the mouth of the sac and the linea alba, where it forms the umbilical aperture, and having carried a probe-pointed bistoury upon the finger behind the linea alba, I cut it to about the extent of three-fourths of an inch.

Pressure was then made upon the tumour, and a portion of intestine immediately returned into the cavity of the abdomen. A piece of adhesive plaster was applied upon the wound. The sac was thus left unopened, and the stricture having been seated in the tendon and not in the mouth of the sac, this simple and easy operation was sufficient to enable me to return the hernia.

Evening.—She had two stools immediately after the operation, and in the afternoon six others. The vomiting had ceased, and the tumour is quite flaccid.

February 6th.—At three o'clock in the morning she was attacked with pain and heat in the abdomen, and sickness, immediately after a violent fit of coughing, and she continued vomiting until nine o'clock, when Mr. Shannon came for me. I found the tumour tense as before the operation, and upon pressing it the intestine returned with a gurgling noise, and I was much gratified I had not opened the sac, as her death, if I had, would have almost certainly ensued from this second protrusion. I ordered fourteen ounces of blood to be taken away, and applied the truss upon the tumour.

Evening.—She had three stools in the morning after the reduction of the intestine.

Feb. 7th.—Complained of abdominal pain this morning at two o'clock, and Mr. Shannon again bled her, and ordered her a cathartic, from which there were four evacuations. She had taken off her truss, which I replaced, with positive orders that it might not be again removed.

Feb. 8th.—She has had evacuations, and is perfectly free from pain. Broths, and other liquid nourishment are allowed.

Feb. 10th.—Her cough is troublesome, but all the symptoms arising from the hernia have ceased. The wound discharges healthy pus.

Feb. 12th.—I pronounced her out of danger from the operation.

Feb. 15th.—She has been sitting up for the three last days. Her cough is the only remaining complaint; the wound requires no further application.

Large hernia.

In the case of Mrs. Herbert, patient of Mr. Hunter's, in Tower Street, where the hernia was intestinal, and had

* In large umbilical herniæ symptoms arising from simple intestinal derangement frequently simulate those of strangulated intestine, and lead the practitioner astray in his attempts to relieve them. From the volume of contents, consisting sometimes of colon, jejunum, and omentum, which are crowded together in this extra-abdominal cavity, their peristaltic action is readily impeded, and slight irregularities of diet will produce temporary obstruction, accompanied by constipation, pain in the tumour, and vomiting. These symptoms, as the cases of our author shew, may be removed by the abstraction of blood, and the conjoined employment of saline purgatives with calomel and opium, more frequently in the umbilical than in the other species of strangulated hernia; and the comparative fatality of the operation, fully attested by the experience of Mr. Pott, Mr. Lawrence, and others, should induce a surgeon to employ those remedies on which, in other forms of the complaint, he might perhaps be disposed to place but little reliance. It is true that the practice and experience of Scarpa are opposed to this, and induce him to recommend the operation to be early resorted to in strangulated umbilical hernia; he attributes the ill success of the operation to its being performed too late. I apprehend, however, that in many cases even were it performed early in the complaint, circumstances peculiar to this hernia would render it often unsuccessful; the large size of the tumour, its free and direct communication with the abdomen, and the character of the patients who are the frequent subjects of strangulated umbilical hernia, are unfavourable to success, and surround the operation with danger.—ED.

been long irreducible; I made the incision upon the orifice of the sac, opened it and passed in a probe-pointed bistoury, and dilated the stricture upwards; then pressing upon the intestine, I discharged its contents into the intestine within the abdomen, left it in the sac, and brought the edges of the wound together with very little exposure of the protruded parts, and with relief to all the symptoms of strangulation.

Stricture at the mouth of the sac.

Mrs. Herbert, aged forty-four years, a patient of Mr. Hunter's, in Tower Street, sent to him at half-past two o'clock in the morning of the 18th of May, 1804, having had no stool for three days, and having been seized with violent pain at the navel, and across the upper part of the cavity of the abdomen.

Case.

She had long been subject to an irreducible umbilical hernia, which now appeared full, and was somewhat painful to the touch, and she had strong eructations, frequent vomiting, and violent pain in the abdomen; her pulse was quick and hard. Calomel and colocynth, oleum ricini, and other medicines of that class had been given without effect. On Saturday the 19th, I was sent for, as she still continued in the same state. I saw her at nine o'clock in the morning, and met Dr. Elliott and Mr. Hunter.

The tumour was now tense and painful to the touch; but, after considerable and long continued pressure, I thought it became somewhat softer. I ordered a tobacco enema, and ice broken and put into a bladder to be applied to the swelling. The medicines which were ordered her were calomel and colocynth united with opium.

At one o'clock on the same day I saw her, when she was in less pain, her pulse less quick and hard, but she had no stool. At eleven o'clock at night I was sent for on account of her suffering more pain; her pulse was quicker; she had frequent eructations, and occasional vomiting, and still had no stool; the tumour was tender to the touch, and the abdomen sore upon pressure.

As it was clear, therefore, that the inflammation was extending into the abdomen, and that it would soon be too late to expect success from the operation, I immediately performed it.

I made a small incision upon the upper part of the tumour, opposite the umbilicus, and cut through a quantity of fat which lay between the skin and the hernial sac: then the sac appeared, which was opened by a very small incision, and intestine was seen adhering within it. No fluid was found in the hernial sac, although the adhesion of the intestine was by no means general. I passed my finger along the surface of the intestine to the mouth of the sac, and found I could insinuate it into the cavity of the abdomen, though with difficulty, without dilating the orifice.

Upon my finger I carried a probe-pointed bistoury within the orifice of the hernia, and dilated it upwards till the finger could readily pass by the side of the intestines into the abdomen, so that they were left quite free from pressure; but as I found the intestine adhering to the internal surface of the sac, in such a manner that it would require a large opening to be made, and a long-continued dissection to divide the adhesions, I thought it better to leave the intestine adhering, and to bring the edges of the wound in contact. I therefore sewed up the small wound I had made, and covered it with adhesive plaster.

Her pulse became extremely quick during the operation, and continued so till I left her, at a quarter before one in the morning; the eructations also continued, but still she expressed herself more free from pain.

Sunday, ten o'clock in the morning. She had a stool in three quarters of an hour after I left her, and has had several since; the pain and soreness of the abdomen have disappeared; the pulse, however, is 120 in a minute, and the tumour is inflamed; the eructations continue. I ordered a poultice to be applied.

Sunday evening, at ten o'clock I met Dr. Lettsom; her pulse was then nearly natural; she was perfectly easy, and had many stools; the eructations had ceased. She was ordered saline medicine, with an absorbent earth, as she complained of heartburn.

Monday 21st. The abdomen was free from pain, the pulse soft and nearly natural; but she has stools in great numbers; and I therefore ordered her opium. The tumour being inflamed a poultice was ordered to be continued on it.

Tuesday 22d. She took last night opium, with magnesiae sulph: on account of her having vomited. She passed a good night, and feels much better this morning. Her pulse is less quick than it was last night; the tumour is relaxed, but the skin over it is slightly inflamed, and shews a tendency to slough at the edge; the tongue is a little furred, and the skin somewhat moist. A poultice of stale beer grounds was ordered.

Wednesday 23d. As she had little constitutional irritation, she was ordered more nourishment, and allowed to drink a small quantity of ale.

Thursday 24. The ale purged her, and she was obliged to take opium to check it.

Friday 25. The skin was hot; her pulse full and quick; and she vomited last night. Opium was given, which immediately checked the vomiting, and improved her feelings.

Saturday 26. She was purged frequently; the threads seemed separating, and I removed them all, excepting one. The edges of the skin now appear healthy.

Monday 28. I took away the remaining thread.

Tuesday 29. The wound appears to be healing quickly under the application of a poultice.

On June 15. She was perfectly well.

In dilating the mouth of the hernial sac and the linea alba, whether the stricture be divided above or below, it requires great care not to wound the intestine, as it is not unfrequent to find it adhering to the peritoneum within the abdomen close to the mouth of the hernial sac; an example of which is seen in one of the plates, taken from a subject dissected by Mr. Forbes, of Camberwell. The intestine in this case adheres so generally to the orifice of the hernial sac, that unless the finger precedes the knife, and the dilatation is performed very gradually, the intestine must be wounded. Much difficulty also attends the returning the intestine into the abdomen under these circumstances, and if the adhesions are very firm it is best to leave the intestine in the sac, and to bring the edges

Intestine adhering to the mouth of the sac.

of the skin together over it, closing it with great care: in short, to perform the operation as it was done in the case of Mrs. Herbert.

Appendices
epiploicæ.

The colon is the intestine usually found in the umbilical hernia, and the appendices epiploicæ of this intestine undergo more alteration in fat subjects than the intestine itself. In the following case I was under the necessity of removing several of them which had become of a very dark colour, before I could safely return the intestine into the cavity of the abdomen; for if they had been left adhering to the intestine, it was probable from their altered state, that they would have sloughed within the abdomen, which must have destroyed the patient.

Mr. Pidcock, surgeon, of Watford, favoured me with the following account.

Watford, Monday, May 1, 1797.

Case.

Mrs. Pickering, aged sixty-four, of a fat corpulent make, had been afflicted with an umbilical hernia for many years, which had been reduced four or five times in the week by herself on going to rest. About five years ago it was slightly strangulated, when the tumour was not one-third so large as at this time. This was reduced by the great assiduity and attention of a surgeon in town.

On Saturday evening last, about ten o'clock, after having spent the evening in a cheerful party, on going to bed a descent of the contents of the hernia suddenly took place, attended with severe pain and vomiting. At one in the morning Mr. Strut attended, and administered some opening pills. On the Sunday morning early I saw her, when the tumour was irregular and very hard, the vomiting violent, and she suffered a severe pain in the abdomen and part affected. The pills had not been retained upon the stomach. I administered a clyster, and made attempts to reduce the protruded parts, but without success, and the pain continued violent, and the vomiting incessant. I ordered a draught, with ten drops of tinct. opii, to be taken every two hours, which seemed to produce a remission of the pain, and the tumour became more soft. About three o'clock, P. M. I kept the part constantly wet with cloths dipped in a solution of sal ammon. in vinegar and water for an hour, and then made a long-continued attempt to reduce it without any success. Previous to this I had taken away about twelve ounces of blood, and the pulse was still small and feeble. The sickness having continued without intermission during the day, at night I ordered a clyster, with one drachm of tobacco infused in a pint of boiling water to be thrown up, which, however, was forced away a few minutes after being administered. A few pills of calomel and opium were given, but could not be retained in the stomach.

In this state she remained during the night without sleep, with the tumour soft, the pulse feeble, great thirst, no hiccough, nor tumour of the abdomen, great sickness and no stool.

Early on Monday morning, when I saw her, I found that she had passed a very restless night, that the sickness was continual, the pulse small and feeble, the tumour and abdomen still painful, and she had had no stool. I again repeated the tobacco clyster as last night, which was immediately rejected, and made a slight attempt to reduce the hernia, but to no purpose.

Seeing no prospect of returning the hernia, and that nothing but an operation could save her life, which, if done immediately, might turn out favourably, since there had been no great degree of inflammation, or any symptoms of gangrene, we thought it best immediately to propose it to the patient, to which she consented, and Mr. Astley Cooper was immediately sent for from London, and the operation performed as soon as he arrived.

OPERATION.

Mr. C. made a crucial incision through the integuments, and having exposed the hernial sac, which was very thin, he made a small opening into it, and the omentum protruded at the aperture. The opening being dilated, a large quantity of water escaped from the sac, and the intestine was exposed by drawing the omentum upwards. The intestine, which was of a dark colour, was the colon, as appeared from its membranous bands, and appendices epiploicæ, the latter of which were of a dark venous colour.

The stricture was next divided by passing the finger to the umbilical ring, and by dilating it upwards, or towards the sternum.

A considerable quantity of water then issued from the abdomen, whence it appeared that she had laboured under ascites; when this was discharged the intestine was particularly examined, and it was not so much discoloured but that it might be safely returned into the abdomen; the appendices epiploicæ were thought to be too much altered to recover their natural state, and several of those bodies were cut away, and the intestine was then returned. The omentum was also returned into the abdomen, where it rested opposite the mouth of the hernial sac.

May 2, the morning after the operation. A clyster given last night staid for some time, but brought away no stool. Has passed a restless night, and complains of pain in the part and the abdomen; but there is no tension nor swelling; she was inclined to vomit during the night; the pulse is small and quick; thirst not so great; a quantity of water has discharged by the wound, but the dressings remain unmoved.

The following medicine was given:—Ol ricini 1 oz.—infus. sennæ, s. 2 oz.—vitelli ovi unius—aq. menth. pip. 2 oz.—spt. vol. aromat. 3 oz.—m. ft. mistura cujus capiat cochl. 2. secundis horis donec alvus soluta fuerit.

On taking the second dose a large and copious evacuation took place, from which she felt herself much relieved, and during the afternoon was easier, and much inclined to sleep.

Evening. Has rested well during the afternoon; the pain is less, and the vomiting is something abated; the pulse is quick and feeble; the thirst considerable; has no pain in her head. She omitted the mixture, after having had two copious stools. Sumat h. s. haust. anod. cum t. opii gtt. xxx.

May 3, Wednesday morning. Has had no sleep during the night; the vomiting decreases; has had two stools; the urine is high-coloured, and deposits a lateritious sediment; the tongue is dry; the skin moist and cool; the pulse small, but not particularly frequent; the matter vomited up is principally bile; there is no tension, nor hardness of the abdomen, and no inclination to eat. The wound, which was dressed with a simple ointment, looks extremely well, without tumefaction, redness, or inflammation; and upon the whole she feels herself much better. In the afternoon, she conceived that a portion of the gut had fallen into the sac; but on examination I found no return of the parts. The vomiting continues slightly.

Haust. salin. 3 oz.—conf. aromat. 1 dr.—pulv. rhub. gr. 10. m. ft. haustus—4th horis sumendus.

Evening. Has slept nearly two hours this afternoon; the parts and other particulars remain as yesterday and this morning. Her sickness is not violent, and has ceased since taking the draught; the pain is less; the pulse is better and stronger. She has drank a little beer, and taken some nourishment.

May 4th, Thursday. Has slept more this night than the preceding one; the sickness continues with a discharge of a greenish colour; has had two stools in the night; the abdomen remains soft and less painful; there is no soreness to the touch; the pulse continues soft and regular.

Cont. haust. salin. 4th horis.

Evening. Has had a stool in the day; has continued a little sick, but by no means so frequently; has little or no pain in the abdomen; the pulse is as before; has had a little desire for food, which she retains.

May 5th, Friday. Had a very indifferent night; was restless and sick, and very rarely retained what food she took; had a stool in the night; and a watery discharge flowed from the wound, which emitted a fætid smell; the pain and soreness in the abdomen are much the same. I removed the sutures, and fomented with anodyne fomentation. Her spirits are very low; the pulse feeble, but regular; the appearance of the wound healthy; a part of the omentum or appendices epiploicæ sloughed away; she drinks a little beer; had a stool during the day.

Sumat haust. cardiac. h. s.

May 6th, Saturday. Has slept much better during the night; the sickness has entirely left her; she is free from any febrile symptoms; the pulse rather quick; appetite better; little thirst; tongue moist; no pain in the abdomen, nor tension. She feels a smarting in the wound, which is very slightly inflamed. There is a suppuration, with a sloughing of that part of the omentum that was left at the wound. Retains both medicine and food on the stomach.

Persistat in usu fatus, and haust. cardiac.

May 7th, Sunday. Has not had so good a night; has been restless, and the wound has discharged a watery matter, and is slightly inflamed; removed a part of the omentum that was about to slough off, fomented, and dressed with digestive and dry lint. Had a natural stool; no fever; the pulse regular.

Evening. Has had a little return of the sickness; is very low and faint. The part gives out a very fætid discharge, but neither the pain nor local inflammation are increased.

Adde tinct. opii g^{ss} xxv. haustui, h. s. sumendo.

May 9th, Tuesday. Slept but very indifferently at night; her strength and her appetite increased; she is free from any unpleasant symptoms; the pulse regular; has two or three natural stools every day; no sickness, nor pain nor tension in the abdomen. The wound appears remarkably well; the remaining part of the omentum came away with the dressings; but there is another sphacelated part on the point of separating, which looks very much like the sac of the hernia. A good discharge of pus appears, and the part is much contracted and diminished in size. Upon the whole she is in a very favourable way.

Foment and poultice night and morning. Dress with dry lint.

Decoct. cinchonæ, mixt. camph. aa 1 oz. tinct. stomach. 2 drachms, m. ft. haust. bis in die sumendus.

Ext. opii gr. iſs. conf. aromat. drachm ſs. m. ft.—Bulus. h. s. sumendus.

Saturday 13th. The part which on Tuesday was sloughing off, bearing the appearance of the sac, has come away from that time in portions, and yesterday the whole was removed, and is very evidently the hernial sac. The wound discharged very good pus, and the whole of it is very much contracted. She sleeps better, but as yet very indifferently; has continued perfectly free from fever. Vomiting very rarely occurs. Has one or two regular motions every day, without the assistance of purgatives. There is no swelling, fulness, nor tension of the abdomen; and she is, in every respect, in a more favourable state.

Fomentation and poultice night and morning. Application—dry lint.

Monday 15th. Has had a very restless night, and a constant sickness and vomiting of a bilious matter, and a very large fætid discharge of a sanious nature, with a quantity of water from the cavity of the abdomen; the pulse low and feeble; no appetite; much thirst; the wound looks flaccid and unhealthy.

Haust. salin. 1 oz. conf. arom. 1 dr. rhub. 2 gr. tinct. gentian. c. 2 dr. m. 4th horis—Dry lint, and a spirituous embrocation were applied.

Tuesday 16th. The sickness much less; the discharge still considerable and very fætid; her pulse is stronger, and the thirst has abated; in other respects well and very cheerful. This watery discharge must have been retained in the abdomen for some time, and its evacuation arises from some change in the patient's position in lying and sitting; but I am at a loss to what to attribute the extreme fætor, except to the discharge from the wound having gravitated into the cavity of the abdomen. The wound itself looks very favourably to day.

Thursday 25th. From the day of the last minutes the discharge has been fætid; on some days very little or not any; on others more copious. The wound is filling up with granulations, and the discharge (as simply connected with the wound) very good. The sickness continues at times, but is rarely very distressing; her bowels perform their office regularly; her appetite on the whole is tolerable. She sleeps the greatest part of the night. Her complaints now are a dry parching heat in the mouth and tongue; restlessness, and great dejection of spirits, and a wandering pain about the abdomen. She makes as much water as usual; has no fever, and the most distressing symptom is, a frequent vomiting of a bilious matter.

From the time of making the above minutes, that is, from the 25th of May, to August 16th, the time when Mr. Cooper saw her a second time, the wound was continually diminishing in size; the discharge decreased, and the former distressing symptoms were then very slight.

The discharge had during this time varied very much; on some days it was in great quantity, and very watery, in others less in quantity, but more purulent. Whenever the discharge decreased suddenly, she felt pain and distention in the epigastric region, and sometimes vomited a watery matter; but on the return of the discharge these symptoms disappeared.

Whenever she walked much, took more than ordinary exercise, or accidentally pressed upon the wound, it became painful and inflamed, but on the application of a poultice these symptoms subsided. Her appetite for food, and general debility, with indifferent

nights, continued much the same until about a fortnight ago, since which she has increased in strength very rapidly. She now sleeps extremely well, and relishes her food and drink as much as before her confinement.

She moves about at this time with the assistance of a small stick, and now and then expresses herself, as feeling better in health and freer from indisposition than she has been many years.

The wound is scarcely the size of a small horse bean, but at the upper part of the original wound, a small sinus continues to discharge in a trifling degree, and a probe will pass by it towards the cavity of the abdomen several inches. She is now left to dress herself, with no other application than a simple plaster of white cerate.

She occasionally takes a few opening pills, and they have been the only medicine of this kind she has required since the second week of the operation. Her appetite is good; she sleeps well; is not in any degree troubled with sickness, flatulency, colic, or nausea, dryness of the tongue or fauces. No anasarca appears, except a slight puffiness in the ancles. Her spirits are good, and she walks about with ease, and is in all respects wonderfully recovered.

November 20th, 1797. She is now perfectly well, the wound is completely closed, and does not afford the most trifling discharge. She is remarkably lively and cheerful. Her bowels regular; one or two small distentions appear in some parts of the parietes of the abdomen, but nothing of consequence.

Intestine adhering
to the sac.

The intestine often adheres to the inner side of the sac. If these adhesions are recent they may be readily and safely torn through by the finger; if they are long they may be divided with the knife; but when short and firm, the sac must be cut away at the adhering part, which may be safely done in this case, as no vessels of any consequence can be injured by the incision, as happens in inguinal hernia.

Omentum removed.

With respect to the omentum, if the sac contains a very large quantity of it, or if in consequence of long continued protrusion it adheres extensively and has become very hard, it should be removed by the knife, taking care to secure the small vessels by ligature if they bleed, and the portion of divided omentum is to be left to form a plug to fill up the orifice of the hernial sac. In one of the subjoined cases the omentum was left to slough, by which a troublesome sore was produced, and a considerable discharge was kept up for a great length of time. In the case of Mrs. Ponder, it will be seen that in consequence of its general adhesion, I left the omentum within the sac, and brought the integument closely together over it, which united without difficulty.

Case.

Mrs. H—, a patient of Mr. Hardy's, Walworth, aged fifty-eight; her symptoms began, in consequence of a fright, at half-past eleven on Sunday night, the 17th. Mr. Hardy was called on Monday morning, at half-past four, and tried the taxis without success; also the enema nicotianæ, opium, and tinct. digitalis, aa. gtt. v. and fomentations and warm-bath. She vomited frequently, and had two slight evacuations from the large intestines; pulse varied from 120 to 90 during the day; enema nicotianæ repeated.

19th. Enema nicotianæ 1 dr. repeated as the vomiting continues; pulse 98 and hard; tumour inflamed; belly little tender; ice ordered; and calomel and opium, with magn: sulph: and infus: rosæ.

20th, Wednesday morning. Mr. Hardy's letter:—

Dear Sir,

When I saw Mrs. H. last night at eleven o'clock, she had vomited after each dose of medicine, I therefore directed her to take half of a draught every hour, and divided the pill, ordering her to take half every three hours.

I was called to her at four this morning, when I learnt she had thrown up each dose of the divided medicine, and had vomited almost incessantly during the night; pulse 120; skin hot and dry; no motion; a clyster thrown up at her own request, which returned in a few minutes, bringing nothing away with it. I gave her a small dose of the opiate medicine, this too has been rejected; and at this moment she is vomiting almost without intermission; the ice being expended last night she has cloths wrung out of cold water applied to the tumour, which is in *statu quo*: pulse 114.

Your's truly,

T. HARDY.

At five o'clock in the afternoon I examined her, and finding a fluctuation in the tumour, with great inflammation, I opened it and discharged a small quantity of pus; found the omentum inflamed, which I cut off in part, but left a great deal of it adherent; dilated the orifice of the sac, and returned or emptied a portion of intestine (from the strong gurgling noise and diminution of tumour I judged so), and brought the parts together with adhesive plaster and lint; bled to 10 oz.

Evening. Had vomited twice, and vomited whilst I was there; pulse 120; ordered fomentations and poultice; much inflammation about the integuments; has had no stool, but has once passed wind downwards.

21st. Mr. Hardy's letter:—

Dear Sir,

The injection was made use of as you directed, but Mrs. H. has not had any motion; a second made of gruel and salt was administered, but without effect. I have just now ordered ext. coloc. e calomel gr. iiss omni horâ; the fomentations and poultice have been applied, and apparently produce ease and comfort; she has been sick twice only since last night; pulse 114.

Your's truly,

T. HARDY.

Four o'clock. Vomited three times since last night; has twice passed wind by the bowels; no violent symptoms of irritation; abdomen free from inflammation; inflammation on the tumour diminished; in no pain, and speaks cheerfully. Ordered castor oil and clysters.

22nd. Has had three stools; vomiting continues, but less frequently; tumour soft and reduced; belly not tender; pulse 100; and she seems better.

23rd. Has not vomited since yesterday; has had five stools; belly lax; no pain; pulse regular, nearly natural with respect to quickness; takes liquid nourishment; no other allowed, because a solid portion might obstruct the bowels.

25th. Purged violently; at eleven o'clock this day, a large quantity of bilious matter burst from the wound; the omentum is sloughing. Ordered *mist. cretae et opii*.

26th. Very low; purging has stopped, so has the bilious discharge from the wound; omentum is sloughing more; bark given; she seems very low, but her pulse is only 96.

27th. Pulse good; but she is scarcely able to speak from an incomplete state of coma.

28th. Pulse more of febrile action, i. e. strong, but jerking and quicker than yesterday; some fluid from the wound; low, but not more so than yesterday; a small sphacelated spot below the wound.

30th. A large discharge of truly faeculent matter from the wound; sphacelated spot increased; omentum in the same state as at first—torpid; pulse about 70; took plenty of nourishment last night, but less to day.

1st of June. Pulse very slow, and so small as to be scarcely perceptible; is sick; takes no nourishment, and is torpid; wound without discharge; omentum in the sloughing state without suppuration; scarcely any faeculent discharge; died this evening at six o'clock.

On the 23d of January last, I was requested by Mr. Wilson, Assistant Apothecary of Guy's Hospital, to visit with him Mrs. Ponder, of Maze Pond, aged seventy years and five days, who had, as he informed me, symptoms of strangulated hernia, and a tumour at the navel as large as a swan's egg. Mr. Wilson had ordered a tobacco enema, and made use of the taxis, but it did not seem that any impression could be made upon the swelling. Case.

I found the tumour of the size he described, situated a little on the right side of the cicatrix of the navel, although projecting through the umbilical ring; it was hard and somewhat irregular to the touch, and I could make no alteration in its bulk after a long-continued attempt to return it. As she vomited frequently and violently, and nothing would pass through the bowels, I requested her to consent to the operation, and it was immediately performed.

As soon as the integuments were divided by a very superficial incision, the hernial sac was exposed, and on opening it a small quantity of clear serum escaped, and the omentum appeared. The incision was then extended from the upper to the lower part of the tumour, and the parts completely exposed. The omentum being next unfolded, a portion of intestine was seen of a claret colour, and all the vessels on it very turgid with blood. I carried my finger behind the omentum, and between it and the intestine, and felt the stricture at the umbilical aperture, which was completely lined by the adhering omentum.

A probe-pointed bistoury was directed by my finger into the orifice of the sac at the umbilicus, between the omentum and intestine, and keeping the blade close to the posterior part of the linea alba, so as to prevent the intestine slipping before it, I divided the stricture (through the omentum), upwards, to the extent of about three quarters of an inch.

The intestine was then returned with slight pressure.

As the omentum adhered very generally to the inner side of the sac, and its vessels appeared unusually large, and the subject, from age, extremely feeble, I did not choose either to return or remove it, but I brought the edges of the skin very closely together by sutures, and left it in the hernial sac, covering the wound with adhesive plaster.

Almost immediately as the operation was concluded she had a stool.

24th. She informed me that she had eleven evacuations in the afternoon and night, and she appears this morning free from pain, and cheerful; the pulse is good; the belly soft and the eructations with which she had been much troubled before the operation, had ceased.

25th. Tongue a little furred; pulse rather quicker than natural; has had two stools; the part was very sore, but her abdomen is flaccid and free from pain.

26th. I found her sitting in her chair, in which she had fainted. I insisted upon her immediately going to bed. Fortunately the sutures had not given way.

27th. Mr. Wilson and myself visited her together, and we found her free from every bad symptom.

30th. She seems low, and a painful tumour can be felt in the beginning of the arch of the colon on the right side. Mr. Wilson gave her calomel.

Feb. 2d. Tumour disappeared after the evacuation. She is very cheerful, and the abdomen is quite soft.

4th. I dressed the wound, which appears healthy.

8th. The wound was again dressed; it is now but small, and is healing fast.

In dividing the orifice of the hernial sac and the linea alba there is no risk of cutting through any vessel of sufficient consequence to endanger life; for it is refining upon anatomy to mention the umbilical vein or arteries in this operation, as the two latter are mere cords, and the former, even if it were opened and divided, would be readily closed by a dossil of lint. The danger in this operation, therefore, is that of wounding the intestine, and not the blood-vessels. Vessels.

After the parts are returned, great care should be taken to close the wound by sutures; this is required in all operations for hernia, but especially in the umbilical, where the passage into the abdomen is nearly direct, and in which, after the strictured bowel has been relieved, peritoneal inflammation often proceeds to the destruction of the patient's life. Sutures.

Mrs. ———, a patient of Mr. Anderson, in Walbrook, who had an umbilical hernia, which was in part irreducible, had symptoms of strangulation on the 1st of September, 1802, which continued until the 4th, when it became necessary to operate.

I made an incision at the lower part of the tumour, following the same course as in the former cases, and exposed a portion of omentum, which was very much hardened, adhering strongly to the inner part of the sac, and forming membranous bands across it.

At the upper part of the sac I felt a fold of intestine passing through the opening at the umbilicus, which opening was sufficiently large to allow, by the yielding of the omentum, a passage for my finger into the abdomen. Still, however, as some force would have been necessary to return the intestine into the abdomen, I thought it proper to divide the stricture, which I did with a probe-pointed bistoury upwards, and found it of a cartilaginous hardness. I then easily returned the intestine, but the omentum was left within the hernial sac without separating its adhesions. The integuments were brought together by sutures.

She had stools soon after the operation, but the inflammation in the abdomen proceeded, and she soon became delirious. She died sixteen hours after the operation.

Case.

Mrs. ———, aged fifty-two, a patient of Mr. Jourdan, in Bermondsey Street, was on March 27, 1803, seized with symptoms of strangulated hernia.

On the 28th I first saw her, and found a hernia at the navel, about the size of a small orange, and projecting upwards towards the sternum, instead of descending in the usual manner towards the pubes.

Her symptoms were, frequent vomiting, pain across the middle of the abdomen, which was tense, but not tender when handled; her bowels were constipated; her pulse 100, and she was extremely restless; the tumour was slightly inflamed, and a portion of skin, about the extent of half a crown, at the lower part of the tumour was mortified. Any pressure of the tumour with the hand excited a disposition to vomit.

I ordered her a clyster, containing half a drachm of tobacco in infusion, which immediately as it was thrown up produced a disposition to evacuate, but the clyster only came away; her pulse immediately after the injection rose to 120.

On the 29th, her general symptoms were the same as before; the vomiting and constipation continued, but the mortification had increased in extent; however, as the symptoms were not such as to lead me to believe that mortification had as yet extended to the intestine, I resolved to cut through the skin at the part already mortified, and to return the intestine into the abdomen; I therefore made an incision through the dead part of the skin only, and found intestine within the hernial sac, which I returned into the cavity of the abdomen.

The pain in the abdomen, which she had previously suffered, became increased by this operation, and the vomiting was equally urgent; her bowels continued constipated, and she had no alvine evacuation. She died the following night, and I could not obtain permission to inspect the body.

Case.

Mrs. Bond, a patient of Messrs. Johnson, John Street, Minories, who had for many years been subject to an umbilical hernia, and which had been often strangulated, was, after a violent cough, again seized on Saturday, June 28, with the symptoms of strangulation. Various trials were made by Messrs. Johnson to reduce it; the tobacco clyster was repeated six times on Monday the 30th, in the quantity of a scruple of tobacco, in infusion, but each time without effect; and on Tuesday, July 1, at eleven o'clock in the morning, having previously made a trial to reduce the hernia, which proved unsuccessful, I performed the operation.

My first incision was made at the linea alba, at the upper part of the tumour, and having exposed an aponeurosis which covered the sac, I put a curved bistoury between the aponeurosis and the sac, and cut the linea alba upwards at the part at which it embraced the sac. Still, however, the intestine could not be reduced, and I therefore opened the sac at its upper part, when a small quantity of fluid escaped, and the omentum was found adhering and thickened. The adhesions of the omentum being then separated, the strangulated portion of intestine was exposed, which was of a deep red colour. Passing my finger upon its upper portion, and a curved bistoury upon my finger, I opened the mouth of the sac upwards. Next, I examined the intestine, and finding that though it was much altered it soon in a great degree recovered its natural appearance, I returned it into the cavity of the abdomen, and brought the edges of the wound together, correctly, by means of sutures.

In pushing back the intestine, I felt a large tumour within the abdomen, which seemed to be a solid mass, reaching from the pelvis above the umbilicus; and on enquiry, respecting her general health, I was informed that it had been gradually declining, and that from extreme obesity she had, without any obvious cause, gradually become thin.

Evening.—I found that from the time of the operation, the pain of which she had previously complained had ceased, but that the vomiting had continued without abatement, and that the flatus had not passed the protruded portion of intestine, for she had almost incessant eructation. She had no stool; her pulse was scarcely perceptible at the wrist; she was extremely restless; her countenance was anxious; her body was covered with a cold sweat. She was ordered thirty drops of tinct. of opium, which quieted her a little.

Wednesday, July 2. I was informed that she died during the night.

DISSECTION.

Dissection.

Thursday, July 3. At one o'clock, accompanied by Messrs. Charles and George Johnson, I opened the body.

On cutting open the hernial sac, we found in it a portion of the intestine, which had descended since the operation; the omentum adhered to the mouth of the hernial sac. The intestines within the cavity of the abdomen were generally inflamed, and the omentum was reddened by inflammation, a great number of blood-vessels being visible upon it, which are not seen when it is in a healthy state.

The lower part of the abdomen was occupied by the tumour, which was felt during the operation. I found it proceeded from the uterus, which had a great number of external polypi upon it; one of which was so large as to project as high as the navel. I removed the uterus that I might make a preparation of the disease; and weighing the tumours the same afternoon, I found their weight to be six pounds and three quarters.

This case serves to shew that any considerable disease, which would not of itself prove immediately mortal, will prevent the success of an operation, the result of which might be otherwise favourable.

The circumstance of pregnancy appears not to add to the risque of the operation, when the constitution of the patient is otherwise good. Mr. Walker, of Hurstpierpoint, has communicated to me the following case in which the operation succeeded in a lady in the fifth month of utero gestation, and her delivery did not take place before the usual period.

Mrs. R——, of Ditchling, Sussex, aged 40, who had for five years a reducible umbilical hernia, was now half gone in her pregnancy of her eighth child, when the hernia became strangulated, but was reduced without much trouble on the 4th of February, 1810. It became again strangulated on the 8th instant, but was apparently reduced after losing sixteen ounces of blood; but from neglecting to wear her truss it became completely strangulated the next day, accompanied with nausea and vomiting, constipation, &c. &c., when trying every means usually recommended without effect, on the 10th of February, 1810, I operated about eleven o'clock.

Case.

The integuments were very thin anterior to a small portion of intestine in a lengthened sac like the finger of a glove, so that I had to pass my finger its whole length before I found the strictured part; and with the blunt-pointed bistoury upon my finger, with a very few slight incisions, I soon reduced it, though it was red, approaching to dark brown, but with very slight adhesions. The remaining part of this day and night my father stayed with her and made the following remarks:—no vomiting since the operation, but the patient has been often troubled with wind in the stomach; does not complain of much pain, except a soreness over the whole abdomen, and a good deal of tension. She became very hot, and pulse fell, about two o'clock, P. M., when I took away about sixteen ounces of blood from the arm, which was sizey and cupped; becoming restless I gave twenty drops tinct. opii; at three o'clock, 1 drachm of a cathartic mixture; at six, the same quantity; at eight, an enema, but no motion; and I think we shall not succeed in restoring her. She has had no sleep; turns often. Eleven o'clock, vomited; twelve, enema came away; at one, fæculent matter till two, with much flatus from the bowels; pulse smaller and languid; gave wine and water; was dozey till three, then slept comfortably half an hour, then oppressed with wind in the stomach. At four, took mutton broth; half-past four, had a motion; pulse 90; five, vomited; much oppressed with wind in stomach; after vomiting slept half an hour. Half-past five, vomited; at six, took 1 drachm laxative mixture; has made no water for eighteen hours; the laxative came up very soon, she then slept till seven, when she complained of sickness a little, but she took sixteen drops of tinct. opii and soon went to sleep again, and slept till near nine, when I drew off the urine, which was high coloured, nearly a pint; pulse 92, soft; continued oppressed with flatus, but not so bad; was thirsty; tongue contracted at the tip; took some dry toast in tea; sickness gone off; skin very little hot; was turned to the other side, and at eleven went to sleep for half an hour; then again for half an hour; then two hours; took gruel; flatus less troublesome. At seven, drew off half a pint of high coloured urine; gave an enema, which succeeded very well; said it griped her a little, and a good deal of flatus came away with copious fæculent matter; said she was often troubled with the wind when pregnant, which prevented her lying down well in her bed. Nine o'clock, began saline draughts, 4 q. horâ, with five drops tinct. opii in each, which soon came up again with good deal of flatus; and this continued at intervals till midnight. Had about three hours sleep in all during the night; was thirsty; urine drawn off; small in quantity and high coloured; gave a dose of senna with salts.

12th. The bowels have not been moved; pulse 100, not full; has had another enema to night, which brought away flatus, and hardly any fæces; directed an emulsion of ol. ricini 4 q. horâ; urine the same; all at once a copious perspiration came on at eight o'clock; pulse smaller, 118.

13th. Has had two doses of the emulsion, which began to operate about midnight, and by five o'clock she had had ten motions, which very much relieved her; pulse 96; perspiration still continuing; abdomen soft; not so thirsty, nor oppressed so much with wind; had only two hours sleep to night. She now took only the haust. sol. cetacei 4 q. horâ. In the evening urine drawn off.

14th. Has slept most of the night, and in every respect better, though the urine continues high coloured; tongue moist, and getting clear at the tip. At four o'clock this afternoon the urine was drawn off, colour natural; pulse 92; flatus less.

15th. Has had but little rest; dreamed very much; more thirsty; repeated the castor oil emulsion, but brought it up again; had an enema; two motions.

16th. More sleep; dressed the wound, which looks well; pulse 96 to 100; in other respects the same.

17th. Has had two motions from physic; pulse 100, small and soft.

19th. Is going on better; has had no motion since the 17th; took more physic, and began to sit up daily, after which she improved very fast, requiring occasionally a laxative pill or two to prevent costiveness; and on the 28th of June, she was delivered of a fine child, which is now living, and the mother is in perfect health:—June, 1815.

For the history and dissection of the following case, in which the operation was twice performed, I am indebted to Mr. Smith.

Mary Cross, admitted February 6, 1801, under the care of Mr. Cline, on account of a strangulated umbilical hernia. It was found necessary to perform an operation, which was accordingly done, and it proved successful; but she remained in the hospital for other complaints till the 28th of May.

Case.

In February 1802, her hernia again became strangulated, and she was taken to the hospital. From the urgency of the symptoms, Mr. Cline thought it necessary to have recourse to the operation immediately, as the usual means had been tried before her admission, and this time it also proved successful. But other complaints again detained her in the hospital till her death, the 27th July, more than five months after the operation. Her complaints after both operations were pain in the abdomen and right leg and thigh, the latter was œdematous. In addition to which, since the last operation, she had a bad cough, and great pain in her loins.

I obtained leave to inspect the body. The hernia formed two tumours, and Mr. Cline at the time of the operation could feel a membranous band between them. I took out the hernia entire, and in the tumour that was most inferior I found a small portion of the ileum and part of the cæcum. In the other tumour there was a portion of colon, and which adhered to the sac. This last tumour I was told had formerly suppurated, and the fæces were discharged from it, and the part afterwards healed; which I think probable, as the skin was extremely thin and appeared like a cicatrix.

When I opened the abdomen I found a mass of disease on the loins, which appeared to be the glands enlarged to a great size; some of them were hard and as large as a goose's egg, others were very soft, and contained a curd-like matter. These glands were more enlarged on the right side than on the left, which probably was the cause of the swelling of the right leg and thigh. In the left kidney there were some small calculi, and in the right there was a large rough stone, about an inch and a half long and half an inch broad, with a process that lay in the ureter, and also about four ounces of a white fluid. The process of stone that lay in the ureter prevented the fluid passing into the bladder. The liver had a great number of tubercles, and the spleen was somewhat enlarged. The lungs adhered to the pleura costalis in every part. The pericardium had no cavity, for it adhered rather firmly to the whole surface of the heart.

She gave me the following account a few days after the first operation: the hernia was produced about four years and a half ago by coughing, but it was never of much inconvenience till about two years ago, when she was attacked with symptoms of strangulation, from which she got better in a day or two, but they returned again in about a month with greater violence. She continued in great pain, the tumour increasing in size, for three weeks, when it burst and discharged a quantity of greenish fætid fluid by four apertures, and then the pain was somewhat relieved. Poultices were applied to the part, which continued discharging the same kind of fluid in great quantity for seven or eight weeks, after which it gradually ceased, and the apertures continued for eleven weeks longer before they healed. She said that her food was found in the poultices for the first seven or eight weeks.

OF THE VENTRAL HERNIA.

THE ventral hernia differs from the umbilical only in its seat. Every hernia protruding through the anterior or lateral parts of the abdomen, except at the umbilicus or the abdominal rings, has the name of ventral.

This disease is not very frequent, for though my situation at the hospitals gives me the opportunity of seeing a great number of herniæ, yet neither my notes, nor my memory, furnish me with more than twenty examples of this disease in as many years. Unfrequent.

In most of the cases that I have seen, it has been seated in the linea alba, and in the greater number, about half way between the umbilicus and the ensiform cartilage. I have also met with it in the linea semilunaris in three examples, in all of which they have been placed below the level of the umbilicus. One of these was in a young lady not more than twenty-two years of age, which was irreducible; another in a corpulent gentleman, advanced in years, patient of Mr. Maiden's, at Stratford; and the third in a young woman, whose case will be hereafter given, on whom the operation was performed.* Seat.

The symptoms attending this complaint are generally the same as those which accompany the umbilical hernia, except that when the hernia is situated at the upper part of the linea alba it often contains the stomach, which gives rise to some peculiar symptoms; for a part of the food by passing into the tumour occasions an increase of it after eating, and the patient is subject to a sinking sensation at the scrobiculus cordis, great flatulency, and depression of spirits. An eminent literary character once consulted me respecting a small tumour of this kind. I applied a truss, which readily prevented the parts from protruding, on which he expressed his wish that I could as easily remove the flatulency, indigestion, and sinking at the stomach which he constantly felt. I told him it was probable the application of the truss might remove all these symptoms, and when I met him in the country a short time afterwards, he informed me that the truss perfectly answered the purpose intended, and that he believed I was right in my opinion as to the cause of his symptoms of indigestion.† Symptoms.

There are four different causes of this disease so far as I have been able to observe; the first and most common is, that apertures are left in the linea alba and linea semilunaris, and between the fibres of the muscles, for the passage of small blood-vessels, and these holes are sometimes larger than is sufficient to allow the vessels to pass, and protrusions of the viscera readily occur through them. Causes.

A second cause is, that the formation of the linea alba is sometimes defective in children. I have a cast in my possession, taken from a child who was brought to Guy's Hospital as an out patient, who had three herniæ in the linea alba, arising from such a malformation. I once saw a tumour about four inches long, and one and a half broad, reaching from the navel, to where the umbilical vein passes to the liver, produced by the absence of that portion of the linea alba, but without any corresponding defect in the skin. This species is readily distinguished from the other, by the great size of the opening through which the hernia passes. Malformation.

A third cause is, a laceration of some of the fibres of the abdominal muscles under violent exertions or from blows, which allows the peritoneum to pass between them. I never, however, ascertained this by dissection, but am disposed to believe it, from the sudden appearance of the disease after a sensation of laceration. Muscles torn.

* The frequency of ventral hernia above the umbilicus is justly attributed by Scarpa to the more compact texture of the linea alba below the umbilicus than above that part, and also to the closer approximation of the recti muscles as they approach the pubes. The yielding of the upper part of the linea alba from the distending force of pregnancy, may also be observed, according to the same author, in the examination of females who have borne many children; the tendinous junction of the muscles is so attenuated by distention as to become semitransparent.

Some cases of fatty tumours being formed upon the spermatic cord, in the site of inguinal hernia, are given in the former part of the work. Scarpa has met with a similar tumour in the situation of a ventral hernia, which he was induced by the presence of certain symptoms to expose by an operation in order to ascertain its nature. A hernial sac could not be discovered, but merely a fatty tumour in an opening of the tendon, which he removed by the knife.—ED.

† The symptoms here attributed to protrusion of the stomach may also arise from the arch of the colon escaping through the aperture in the tendon; and, as Scarpa notices, Garengot, who has written upon the ventral hernia of the stomach, has not given a case in which it was ascertained by dissection: and in two dissections of this hernia, one by La Peyronie,* and one by Littre,† a portion of the colon was discovered in the sac, and productive of those symptoms usually attributed to hernia of the stomach.—ED.

* Mem. de l'Academie de Chir.—tom 4.

† Mem. de l'Acad. des Sciences.—1714.

Wounds.

The fourth cause of ventral hernia, is a wound through the parietes of the abdomen, in which the skin afterwards heals, but the muscles never unite. The following case is an example of this, which was communicated to me by my friend Mr. James Wardrope, of Edinburgh. Sometimes in these wounds a protrusion of the intestine occurs, which is lacerated by the injury, and an artificial anus remains during life. Of this an example was lately to be seen in Saint Thomas's Hospital, sent there by Mr. James, of Hoddesdon. The subject of it was a woman who had been gored by an ox; the horn tore the intestine as well as the parietes, the intestine became protruded and inverted, and the fæces were discharged through the opening.

Dear Sir,

Edinburgh; October 25th, 1806.

The case about which you inquire was as follows.

Case.

A strong healthy man of twenty-four years of age, twelve years ago, when sliding down a rope, a piece of wood fixed to it, forcibly penetrated the abdominal parietes. It entered about half way between the anterior spinous process of the ilium and pubis, passed in the direction of the tendinous fibres of the external oblique muscle, and again appeared exteriorly about four inches above the first wound. The intestines immediately came out at both wounds; they were reduced, and in about two months the wounds were healed.

Ever after the accident he observed a swelling at the place where the parietes were wounded, which has gradually been enlarging. When I saw him the tumour was about six inches in length, four in breadth, and of a rounded form. It was a soft elastic mass, and could by moderate pressure be made to entirely disappear, but when the pressure was removed, in a few minutes it regained its former bulk; the motions of the intestines could be seen as they filled the bag, and they rushed in with a gurgling noise. The coats of the tumour were very thin, and the external skin was marked with cicatrix. There was a very considerable loss of substance of the abdominal parietes, and the opening between the sac and cavity of the abdomen was very large. He was employed as a shoemaker for eleven years after the accident, and he afterwards found so little inconvenience from the swelling that he returned to sea.

I am yours, &c.

JAMES WARDROPE.

Dissection of.

The dissection of the ventral hernia offers the following observations. In examining the small one (of which I have given a plate), which was situated a little above the navel, when I cut through the skin, a loose fascia was exposed, which was the aponeurosis of the external oblique muscle, and to the inner side of this was glued another, which proceeded from the edge of the aperture in the linea alba, and which seemed to be a fascia formed to fill up the opening in the tendon. Under these fasciæ there was a considerable quantity of fat, which being dissected away, exposed the hernial sac, which was of a dark blue colour. Between the fascia and the sac a small blood-vessel was observed, which passed through the same opening with the hernia.

In the large ventral hernia, of which I have given two views, I found only one fascia covering the sac, in other respects it resembled the former. In both, the umbilical vein had been pushed into the sac, and adhered to its anterior part.

Of the Reducible Ventral Hernia.

Reducible.

When this hernia is situated in the linea alba, and can be returned into the cavity of the abdomen, it requires the same small truss as that which I have recommended for the incipient umbilical hernia. If, however, it arises from any extensive deficiency of this tendinous line, it is necessary that the form of the pad should be varied so as to cover a greater extent of surface than the tumour, in which case the pad should be from four to five inches long, and two inches broad.

Truss peculiar.

If the hernia is placed at the lower part of the linea semilunaris, it is proper to apply a truss similar in its general form to that which is made use of in the inguinal hernia, but the pad in this case is to be turned upwards, instead of taking its usual direction. The truss is to be applied round the pelvis, and the pad is to be turned towards the linea semilunaris so as to cover the orifice of the hernial sac.

Irreducible.

The irreducible ventral hernia requires the pad of the truss to be made hollow. The general form of the truss resembles that used in the umbilical. It was in an irreducible ventral hernia at the lower part of the linea semilunaris that I applied the inguinal truss, with the direction of the pad reversed, which I have described above, and as the hernia appeared to be omental, I had the pad made hollow to gently compress the tumour. The patient wore the truss with ease, but as she lived at a distance in the country, I have not had an opportunity of learning whether the tumour has been absorbed.

Of the Strangulated Ventral Hernia.

Strangulated taxis.

As the ventral hernia, like the umbilical, is pendulous, the surgeon, in employing the taxis to reduce this hernia, ought, after grasping the tumour, to direct his pressure upwards, as the orifice of the sac is placed in that direction.

The same general means which have been directed in the strangulated umbilical hernia are to be here employed; and it may be observed that in this hernia, as well as the umbilical, medical treatment alone will more frequently succeed in reducing this hernia than either the inguinal or crural. I have been twice called to a patient of Mr. Maiden's, of Stratford, who had a ventral hernia in the linea semilunaris, and laboured under symptoms of strangulation; he appeared to be more relieved by purgative medicine, by clysters, leeches, and fomentations, than by the use of the taxis, which it was difficult to employ on account of the size of the tumour, and its being embedded in adeps.

Medical treatment.

In performing the operation for this species of hernia, the sac should be opened by a similar incision to that we have recommended in the umbilical hernia, that is to say, in the form of the letter T, which leaves a valve of skin to cover the opening, after which the mouth of the sac is to be opened, and the linea semilunaris dilated at its inferior part; but if the tumour is placed at the lower part of that line, the sac is to be dilated upwards or downwards according to the situation of the epigastric artery, which crosses the linea semilunaris at its lower part.

Operation.

But if this hernia is very large, it will be right to make a small opening through the skin to the tendon which surrounds the sac, and to divide the tendon without opening the sac, in the way which has been stated in treating of the umbilical hernia. I shall conclude this account of ventral hernia with the following cases.

Large hernia.

On Sunday the 23d of March, 1806, I was sent for by Mr. Holt, of Tottenham, to see Mrs. W——, of Tanners End, who had a ventral hernia, which had become strangulated on Saturday, the preceding day.

Case.

On Monday morning at one o'clock, I met Mr. Holt there, and found a hernia about as large as my fist, situated in the linea semilunaris, about an inch and a half below the level of the umbilicus. After a long continued attempt I succeeded in reducing it, and her truss was applied, which was not only originally badly constructed, but was nearly worn out by continued use. Some opening medicines were ordered her, and she was desired to keep her bed.

I was surprised at being sent for to her on the afternoon of the same day, on account of the hernia having again descended, and upon inquiry found that, soon after we quitted her, she had got out of bed, and sat for some time near the fire, and that the truss had allowed the hernia to redescend. Mr. Holt had attempted to reduce it, and I repeated the attempts without success, and it was, therefore, agreed that the operation should be performed, as she had already very urgent symptoms, and the abdomen was becoming tender to the touch.

The operation was well performed by Mr. Holt. He made an incision across the middle of the tumour, which was covered with a large quantity of adeps; the sac being opened, exposed omentum only, which adhered very generally to the inner side of the sac. The opening of the sac was with difficulty found, on account of the adhesions of the omentum, but a probe-pointed bistoury was with care insinuated into it, and the stricture divided. The omentum was returned into the cavity of the abdomen, the integuments were brought together, and the wound carefully closed.

After the operation she had several stools, and great hopes were reasonably entertained of her recovery; but on Tuesday, she had no evacuation from the bowels, had frequent eructations, and repeated vomitings, which, together with increasing soreness of the abdomen, clearly shewed that peritoneal inflammation had come on.

Mr. Holt bled her largely, and she had clysters administered.

On Wednesday, I found her vomiting frequently, her abdomen extremely tense, and tender to the touch, and she had frequent hiccough.

On Thursday morning she died.

Her body was not examined, but it was sufficiently obvious that she died of peritoneal inflammation.

A strangulated ventral hernia became the subject of operation at Saint Thomas's Hospital, and the following particulars of the case were communicated to me by Mr. Wagner.

A man, aged forty-two years, a tide-waiter, was admitted into Saint Thomas's Hospital on Sunday, five o'clock p. m., January 5th, 1816, for a strangulated ventral hernia. He had led a very irregular life, and had been subject to rupture for eleven years past; it was first induced by making a violent effort and straining himself; the protrusion had not been troublesome until the last six years, during which he wore a truss part of the time, but lately had found a tight waistcoat to answer very well to keep up the hernia; for a week past he had neglected his waistcoat, and having a violent cough, he supposes the present state of strangulation to have occurred from a fit of coughing. The tumour frequently increased in size, became tense, and resisted his efforts at reduction for twenty or thirty minutes; but he had always succeeded in returning the greater part of the hernial contents into the abdomen, but could never return them altogether. On Saturday, about three o'clock a. m., he was seized with violent pain in the abdomen; the tumour was increased in size, and notwithstanding several efforts made by himself, he could not return the parts; vomiting came on, and he was very anxious; a medical man was sent for, who ordered him a plaster to the swelling, and gave him an opiate; the vomiting continued occasionally during Saturday. He suffered excessive pain, and had a sense of tightness about the upper part of the abdomen; he had, what he considers, a free evacuation from the bowels on Saturday afternoon; he had discharged much wind from his stomach.

Case.

On Sunday, January 5th, 1816. The pain abated; he has been comparatively easy; he has had but little vomiting, and has not had any stool. Upon removing the plaster which had been applied to the tumour he observed the skin discoloured, of a purple appearance, and the cuticle raised; the discolouration has increased very much to-day, and his strength has failed him very fast. When he was admitted this afternoon, the appearances and symptoms were as follow:—His abdomen very large and pendulous; a tumour about the size of a pint bowl, situate midway between the scrobiculus cordis and umbilicus, very tense and hard; insensible and cold, giving a crackling

sensation to the touch; the whole surface of the swelling of a dark purple appearance and abraded of its cuticle; the integuments surrounding the basis of the tumour were to a considerable extent cold, insensible, and somewhat inflamed; some vesications containing a bloody serum existed below the umbilicus; there was no tenderness on pressure in any part of the abdomen; he was very anxious and restless; could lay most easy upon his side, but was not in any particular pain; his breathing was laboured and oppressed, as though the lungs could not be fully expanded; he occasionally discharged wind by the mouth, but he had neither sickness nor vomiting. He has had no stool since Saturday, and has not had hiccough; his extremities are cold, and he complains of coldness in the tumour; the pulse could not be distinguished at the wrist so as to note it; he was perfectly sensible.

Mr. Travers saw him about seven o'clock P. M. Sunday. A crucial incision was made over the centre of the tumour through the dead integuments; the parietes of the sac were very thin; several convolutions of small intestines were exposed, most of them of a very dark chocolate colour; one of them I thought was more of the ash colour, and which seemed to be most advanced in the state of mortification; this was not particularly examined, but the other convolutions were; the blood in the vessels was coagulated, and could not be pushed through them. The intestines were greatly distended with flatus, to discharge which, as well to evacuate any accumulation of fæculent matter, a free opening was made by a pair of scissors through the coats of one of the convolutions; it was evacuated of its flatus and a little fæculent matter, but did not lessen the distention of the other convolutions; this portion of bowel was secured by ligature, through the mesentery, to the external parts; the contents of the sac were cold, like the external parts, and insensible. There did not appear to be any omentum in the sac; the finger was readily passed from the sac into the abdomen; the mouth of the sac, however, was very deep, and the intestines did not appear to be strictured; a distinct line of warmth and sensation was observed between the contents of the hernial sac and those of the abdomen. When the finger passed into the abdomen it caused an uneasy sensation, and the patient discharged a quantity of wind and some fluid from his stomach; the parts were left in the most easy situation. Some of the intestines protruding at the wound were washed with warm water; he took some wine, and was ordered to have fomentations applied constantly to the abdomen; he was very weak; sweated profusely during the operation; was insensible to impressions that were made on any of the parts in the hernial sac. The breathing, soon after the operation, became more difficult, and he died in about an hour.

Upon examination after death the whole sac was in a mortified state; it contained a very large proportion of the small intestines, and considerable part of the omentum; they were in a sphacelated state; two longitudinal bands divided the sac into three pretty equal compartments; one of the bands was formed by the remains of the umbilical vein. The mouth of the sac could admit the passage of an orange into the abdomen; it was situated in the linea alba, and about three inches above the umbilicus. The viscera in the abdominal cavity were not inspected.

OF THE PUDENDAL HERNIA.

THIS hernia is situated in the middle of the external labium pudendi, a little above a line drawn from the orifice of the vagina outwards. Situation.

The size of those which I have seen, has been that of a pigeon's egg, and the figure of each was pyriform. Size.

They were elastic to the touch, conveying the impression to my mind that they contained intestine only. Like other herniæ they descended in the erect, and ascended in the recumbent posture, dilated when the person coughed, became occasionally tense and painful, and produced frequent interruptions in the functions of the bowels, but the patients were generally easily able to return them into the cavity of the abdomen. Figure.
Intestinal.

This hernia is very readily distinguished from the common inguinal, which also passes into the labium pudendi, because the species of hernia I am now describing has no communication with the abdominal ring, and the upper part of the labium is entirely free from swelling, whilst the tumour in this case occupies nearly the centre of the labium, and extends on the inner side of the branch of the ischium into the cavity of the pelvis. Diagnosis.

This tumour is felt as a ball in the labium, and if the finger is passed into the vagina, it is found to extend upwards into the cavity of the pelvis between the ischium and the vagina, till it ceases to be felt at the os uteri.

The lower extremity of this swelling occupies the doubling of the external labium; its middle part is situated between the ischium and the vagina, and its orifice into the cavity of the pelvis is placed near to the os uteri.

This hernia differs but little from the lateral vaginal in its commencement, but at its lower part, instead of pressing the vagina forward, in form of a hernial tumour, it passes beyond the vagina, and appears in the labium pudendi. Differs from the lateral vaginal.

I am inclined to believe that this disease has been mistaken for the hernia foraminis ovalis, and that it has been observed by other medical men, who examining it in the living subject when it was not in a strangulated state, have been led into a mistake with regard to its real nature. I once asked Dr. Lowder, Lecturer on Midwifery, if he had seen any example of the hernia foraminis ovalis; he said that he had, and that it had extended inwards so far from the foramen ovale as to reach the middle of the external labium, whence it could be easily pressed into the cavity of the pelvis. Upon farther inquiry, I found that he conceived it had passed through the foramen ovale, and afterwards turning inwards at a right angle with its neck extended to the middle of the external labium pudendi. But when we attentively consider this subject, we shall find it scarcely possible that the hernia foraminis ovalis, which is small in size, and embedded in the triceps muscle, should pass through the gracilis first, and afterwards the fascia of the thigh, and extend itself so far as to distend the labium, and produce an appearance like that which I have here described. At all events, the cases which I have seen were not of that description. Mistaken for the hernia foraminis ovalis.

This swelling is liable to be confounded with a disease, which does not unfrequently occur on the inner side of the labium, in the form of a tumour that distends the labium;* it is elastic to the touch, and often becomes of considerable magnitude. It arises from an obstruction of the lacunæ, situated near the orifice of the meatus urinarius and vagina, in consequence of which an accumulation of fluid takes place, which either proceeds to the production of a large tumour, containing a fluid like the white of an egg, or sometimes occasions inflammation terminating in abscess. These swellings, though they resemble each other somewhat in their seat, are found by attentive inspection to differ so much as to be capable of being distinguished from each other. Liable to be confounded with the diseases of the lacunæ.

* I was called by Mr. Benjamin Atkinson, Nicholas Lane, to a patient of his, who had one of these tumours situated on the inner part of the labium, near the os externum vaginae. It appeared through the nymphae of a light blue colour, tense and elastic, and had an obscure sense of fluctuation; it did not dilate in coughing, and pressure made no difference in it. I advised its being opened, to which she would not consent.

A woman in St. Martin's Le Grand, came to me last summer with a tumour of this kind. I called at her house, and passed a small seton through it, and a glary fluid was discharged; a considerable degree of inflammation arose from the part, and constitutional irritation supervened; I withdrew the thread after ten days, when the suppuration was completed, and she got well.

Dr. Haighton desired I might meet him to see a patient of his, who had a similar tumour larger than a pigeon's egg on the inner side the left labium. I made an incision into it, and introduced lint into the cavity. She got well in three weeks with little constitutional irritation.

The tumour which I have just mentioned does not dilate on coughing; fluctuates; cannot be traced entirely into the cavity of the pelvis by the side of the vagina, and the os pubis and ischium can be felt behind it; it does not descend in the erect, or disappear in the recumbent posture.*

To the following case I was called by Dr. Best, of York, who at the time this occurred was attending the Carey Street Dispensary.

Case.

Dr. Best called on me the evening of the 18th of May, 1802, to request me to see Sophia Hall, aged twenty-two years, who laboured under symptoms of strangulated hernia. He informed me he had made a slight attempt to return the hernia about an hour before, but it was unsuccessful; its size was about that of a pigeon's egg, and it was situated in the left labium; it had frequently descended during the last six months, and she was able to reduce it herself with little effort and with little pain.

The hernia had at this time been down three weeks, and upon the whole of the 16th and 17th (that is, the two preceding days), it had given her great pain when it was touched, but still more when she coughed.

As she had been ill from a peculiar nervous attack, Dr. Best thought that she was probably prevented by this cause from attempting to return it herself, as she had been in the habit of doing. When I examined the swelling, I was surprised to find it situated below the middle of the labium, and the upper part of the labium, the abdominal ring, and the parts about it, quite free from tumefaction. Examining her per vaginam, I found a tumour extending by its side nearly as far as the os uteri. I desired her to cough, and found it immediately dilated. I then grasped the swelling, and pressing on it with some little force, which gave her a great deal of pain, in about three minutes it went up with a gurgling noise, and she became easy. The labium then felt flaccid as if a tumour had been taken from it, and when the finger was placed upon this flaccid and hollow portion of skin, it could be forced back into a circular orifice on the inner side of the branch of the ischium, and between it and the vagina. The only method she has since used to keep the hernia up is, to wear a common female bandage between the thighs, and fixed around the abdomen. The last time Dr. Best heard of her was in the August following, at which time she was in perfect health.

The following is Dr. Best's letter.

York, May 19, 1806.

My dear Sir,

The young woman to whose case you allude, and whom you was so kind as to visit on my account, was twenty-two years of age. How long she had been subject to hernia, or how it first commenced, I am unable to inform you. I remember, however, her saying that it had frequently come down during the last five or six months, and that she had always before been able to reduce it herself without either difficulty or pain. At the time you saw her, which was on the evening of the 18th of May, 1802, the hernia had been down nearly three weeks, and the whole of that and the preceding day had given her much pain, both when she coughed and when it was touched. The illness and extreme debility under which she laboured, had, I suppose, prevented her from reducing the tumour in the first instance, as she had always done on former occasions.

About an hour before you saw her, I examined the tumour, and made some ineffectual attempts to reduce it. To the best of my recollection, it was somewhat less than a pigeon's egg, of a smaller diameter, but more oblong form.

At the time you reduced it, she was laid in a supine posture. You sat on the bedside on her left hand, with your face towards the upper part of the bed. The time you employed in reducing the tumour could not be more than two or three minutes, perhaps not so much, but she complained of the process giving her very severe pain. The only method she used to prevent a return of the tumour was, passing a bandage under the perineum, connected at both its ends with another bandage, which surrounds her waist. For six or seven weeks previous to your seeing her, she had been afflicted with an irregular, severe, nervous disorder, on account of which I left her in your possession. She was then convalescent, fat, and was perfectly well in about a month afterwards. The last time I heard of her, was in the August following, when she was in perfect health, and did not complain of any return of the hernia. She resided at the time we saw her with a married sister, No. 4, Axe Court, Hackney Road. Her sister's name was Kemp, her own Sophia Hall. I remain, &c. &c.

CHARLES BEST.

Case.

A young woman, whose age was twenty-two years, called at my house, complaining of a tumour of a similar kind with the above, in the right labium pudendi. Its size was somewhat less than that of the former case; it descended in the erect, and returned into the abdomen in the recumbent posture, it dilated upon coughing, and became much distended during the evacuation of the fæces. She supposed it had been occasioned by having been thrown out of a one-horse chair, by which accident she received a blow on the lower part of her belly, and soon afterwards she observed the swelling.

I ordered her to wear a small pessary of sponge in the vagina, and I have not since seen her.

When this species of hernia is in the reducible state, it may be prevented from becoming larger, and occasioning inconvenience, either by wearing a common female bandage, or, what would answer the purpose better, by the application of the truss employed for the relief of the prolapsus ani; its distance from the vagina is too considerable for it to be readily prevented descending by the use of the pessary, unless the instrument were of very large size, yet it can only be by such an instrument that a prospect of a cure can be reasonably entertained, as no other can close the orifice of the sac.

* These mucous tumours I have occasionally met with in practice, bearing the same characters as described by the author. In one instance, the tumour, which was about the size of a hen's egg, was confined to the vagina, and was represented to the patient by her medical attendant as a vaginal rupture, for which a pessary was recommended. The lining membrane of these cysts is occasionally but little disposed to inflammation, and has in some instances resisted the introduction of a seton, stimulating injections, or even applications of lunar caustic; but a free incision into the cyst, followed by the introduction of lint, is the surest method of inducing suppurative inflammation: the granulating process completes the cure.—Ed.

In the irreducible state, it cannot be otherwise relieved, than by the constant support of a bandage, which would tend to prevent its growth.

When this hernia becomes strangulated, the mode of attempting its reduction consists in the surgeon placing himself upon the diseased side of the patient, and then embracing the tumour with his fingers, he is to press it with gentle and regular force against the inner side of the branch of the ischium, and from the yielding nature of the parts through which this hernia descends, I am inclined to believe that these efforts will very generally be attended with success. If they prove unsuccessful, the warm bath, bleeding, and the tobacco clyster ought to be tried, and then the attempt at reduction should be repeated.

If the hernia cannot be reduced, and the symptoms of strangulation continue, an operation ought to be performed, which, although difficult, is certainly far from impracticable. An incision should be made into the labium, to expose the lower part of the tumour, and the hernial sac being carefully opened, and the intestine exposed, a concealed bistoury should be passed up the sac, and directed by the finger previously introduced into the vagina, the division of the mouth of the sac ought to be made directly inward towards the vagina. The bladder should be emptied previous to the operation, and even before the first attempts at reduction are made.

OF THE VAGINAL HERNIA.

THOSE who are in the habit of practising midwifery must necessarily see this disease more frequently than a surgeon engaged in general practice ; but few examples of it have occurred under my observation.

Case.

The first was in a young woman, aged twenty years, who had never had children, and whose case I was informed by Mr. Stocker, Apothecary, of Guy's Hospital, was worth examination, on account of a tumour which projected into the vagina. She was ordered to place herself in the recumbent posture, with her shoulders a little elevated, and an examination being made per vaginam, I felt a swelling a little above the os externum vaginae, the size of which was that of a small billiard ball. It was situated at the posterior part of the vagina, but rather to the left side ; it was elastic, and not at all painful to the touch. When I compressed it, it readily passed away, but upon directing her to cough it was reproduced. When I ordered her to place herself on her knees the swelling became very tense and much larger than before, and when she coughed it dilated as any other hernia, but more forcibly.

Symptoms.

Having placed herself again in the recumbent posture, I pressed the swelling entirely away by keeping the fingers about half a minute on the posterior part of the vagina, and then carrying the fingers higher up in the vagina above the seat of the tumour near to the os uteri, and having pushed the vagina towards the rectum, I directed her to cough, and the tumour was not reproduced. Still pressing at the same part, I desired her to rise, and so long as the pressure was supported the hernia did not return, but almost immediately as the fingers were removed the tumour became as large as before.

The inconvenience she suffered was, that she was incapable of taking much exercise, and could not engage in those laborious exertions which were required for her support, as she was in indigent circumstances ; for she found, whenever she exerted herself much, a sense of bearing down as if something would burst its way through the part. She was ordered to wear a pessary ; but when I last heard of her she had not followed this advice, and she continued to suffer the same inconvenience from the tumour.

Seat.

This hernia protrudes into the space that is left between the uterus and rectum, which allows the intestines to descend between them. This space is bounded below by the peritoneum, which is reflected from the vagina to the fore part of the rectum, and between this reflection and the perineum is situated a loose cellular membrane. The pressure of the intestine then upon the portion of peritoneum forces it downwards to the perineum, and being unable to pass further in that direction, it is pushed towards the vagina, and projects its posterior part forwards. This hernia has been sometimes found placed more laterally, producing a tumour on the side of the vagina instead of its posterior part.

If this tumour then were dissected, the vagina would be found covering it anteriorly ; behind this is placed the peritoneum, and then the intestine would be seen in the peritoneal sac between the vagina and the rectum. I wish it, however, to be understood that I have had no opportunity of examining this disease in the dead body, and that I am here describing it, from what is known of the structure of the parts, and not from actual dissection.

Reason why it is not more frequent.

It appeared astonishing to me when I first considered this subject, that the disease did not occur more frequently, for the small intestines always descend into the pelvis, and the reflection of the peritoneum is too feeble to be able to support any considerable pressure. But I believe the reason of its being comparatively rare, is, that the oblique position of the pelvis is unfavourable to its production.* In the erect, as well as in the sitting posture,

* The erect attitude of the body and the effect of the abdominal muscles and diaphragm, in forcing the viscera against the outlets of the pelvis, might seem to render pelvic herniæ complaints of frequent occurrence ; but nature has provided a fascia of great strength to protect these apertures against visceral protrusions, by which this form of complaint is rarely met with even in the female. This pelvic fascia appears to be continuous with the fascia iliaca, particularly with that portion of it which receives the insertion of the psoas parvus muscle. M. Cloquet has given a description of it in his *Recherches*, which appears from examination to be sufficiently exact. Passing into the pelvis to the superior aperture of which it is attached, it forms a large *cul de sac* which supports the peritoneum on all sides, only leaving openings for the several organs. Posteriorly towards the base of the sacrum, one or more openings are formed from the ilio-lumbar vessels, and frequently a strong tendinous arch is seen extending from the base of the sacrum to the body of the last lumbar vertebra and its intervertebral substance, and under which pass the large nerves that form the communication between the lumbar and sacral plexus. In the same region, at the ischiatic notch, the pelvic fascia forms openings for the passage of the glutæal vessels, and then passes before the pyramidalis muscle and the sacrum. It is difficult to trace it here, because the number of openings that are formed in it give it an areolar appearance ; it forms a kind of fibro-cellular net-work, interlaced with the hypogastric vessels and nerves. Above the ossa pubis it is continuous with the fibrous structure of the crural canal, and is perforated by the circumflexæ ilii vessels ; below the os pubis it covers the levator ani muscle, and forms a fibrous arch, which is distinct from the aperture which the obturator ligament forms

the intestines fall rather upon the symphysis pubis, and the bladder, than on the posterior part of the pelvis, and when thus gravitating into the anterior part of the pelvis they push the uterus against the rectum, and close the space which would be otherwise existing between them. But for the oblique position of the pelvis this must be a very frequent disease, for upon passing my fingers in the dead body from behind the uterus within the cavity of the pelvis in women who have died a few weeks after delivery, I have found that I could thrust the reflection of peritoneum between the uterus and rectum readily down to the perineum.

It appears in the case which I have related, as well as in those which I have been permitted by my friend Dr. John Sims hereafter to describe, that these herniæ contained intestine, and that will very generally happen, because although the omentum is sufficiently long to reach into this part of the pelvis, yet it is generally situated between the intestines and the anterior parietes abdominis.

Another case of vaginal hernia which I have seen, was that of a girl, a patient of mine in Guy's Hospital, who was admitted for what was supposed to be a prolapsus uteri. Her age was seventeen. When I examined her, a tumour was found situated just under the meatus urinarius, forcing the anterior part of the vagina through the os externum. In passing my finger to ascertain the state of the os uteri, when I pressed upon this swelling her urine was immediately discharged, and the tumour became flaccid. This induced me to make a more particular examination, and I then found the following circumstances. There appeared a tumour just under the meatus urinarius, of a florid red colour, projecting the anterior part of the vagina beyond the os externum vaginae. The tumour was broader than it was deep, being about two inches in breadth, and one and a half in depth. I pressed upon it, and the urine immediately flowed from the meatus urinarius. I directed her to discharge her urine, and the swelling became quite flaccid, but on the following day when the urine had reaccumulated, the tumour was as large as before. Dr. Haighton, who examined her, found the same appearances. She continued some weeks in the hospital, but I could suggest no relief for her complaint.

Dr. John Sims had a lady under his care with a hernia of a similar kind; it projected the anterior part of the vagina, was situated under the meatus urinarius, and when compressed the urine was discharged by the meatus, and the swelling became flaccid. This disease probably arises from a relaxed state of the portion of peritoneum which is reflected from the bladder to the uterus, which allows the bladder to yield to the superincumbent weight of the intestines.

To the same gentleman I am also indebted for the following cases of herniæ at the posterior part of the vagina.

He was called to Mrs. P——, a lady under thirty years of age, who had a tumour at the posterior part of the vagina, which passed down between it and the rectum, and thrust the vagina forwards. The nature of this case had been dubious to those who had previously attended, but the doctor became acquainted with its real nature, from finding that he could distinguish solid faeces within the tumour. He directed a clyster to be thrown up, and the swelling became soft, and then yielded to the pressure which he made upon it. Notwithstanding the swelling was very large, she continued to have children, but she suffered great inconvenience from a sense of bearing down whenever she used exercise, so that she is on that account prevented from taking it, and all the persons the doctor has seen in this disease suffered extremely from the same symptom.

When this hernia is in the reducible state a pessary is obliged to be worn to prevent its descent.

A lady, aged about thirty-five years, consulted Dr. Sims for a hernia at the posterior part of the vagina, which rendered it difficult for her to use any exercise, and entirely incapacitated her from doing so if she did not wear a pessary. Pieces of sponge were at first used for the purpose of preventing the descent of the hernia, but they were found to be inadequate to the purpose, and she is under the necessity of wearing a globe pessary, which succeeds extremely well, at least in removing the uneasiness and sense of weight in the part, of which she had previously complained.

for the passage of the obturator vessels at its upper part. Reaching the bottom of the cavity of the pelvis, it proceeds with the levator ani, with which it is intimately connected, to attach itself to the sides of the rectum, of the bladder in the male subject, and of the vagina in the female. It thus supports the peritoneum by strengthening the inferior parietes of the abdomen. With regard to the openings for the rectum, bladder and vagina, they can only be imagined; the adhesions which it forms with these viscera being such as to render it difficult to make an accurate dissection of them. In tracing the union of this fascia with those which line the other abdominal parietes, it will be seen that this cavity is lined throughout by a large aponeurotic bag, the strength, thickness, and connexion of which vary in different regions; that the fibrous sac gives a more or less firm support to the peritoneum, and is pierced by numerous openings for the passage of nerves, vessels, &c. It is through these apertures that the peritoneum is protruded in the various kinds of herniæ now under consideration.—Ed.

OF THE PERINEAL HERNIA.

Seat.

THIS hernia descends in men between the bladder and the rectum, and in women between the rectum and the vagina.

No external tumour.

It protrudes as far as the skin of the perineum, but does not project it so as to form an external tumour; its existence in the male can be only ascertained during life, by an examination by the rectum; but in the female, it may be felt both by the rectum and by the vagina.

Dissection of.

The plate which I have given of this disease, was taken from the body of a male subject brought for dissection to Saint Thomas's Hospital; the preparation is now in the possession of Mr. Cutcliffe, Surgeon, at Barnstaple, in Devonshire, to whom the subject belonged. This drawing was made whilst the parts were in the recent state, and it differs from the preparation in half the bladder being represented as being removed, as it would have prevented the hernia from being seen.

The peritoneum, which is naturally reflected from the posterior part of the bladder to the anterior part of the rectum, was pushed down to the perineum by this hernia, but the skin did not appear to have yielded so as to have formed any external swelling.

The lower extremity of the hernial sac was placed before the anus.

The prostate gland was situated immediately anterior to the fundus of the sac.

The fundus of the vesicula seminalis was placed upon the lateral part of the sac, its apex was situated before it.

The bladder covered about one inch and three quarters of the anterior part of the hernia.

The mouth of the sac was two inches and a half from the anus.

Symptoms.

As to the symptoms which this disease had produced, I had no opportunity of ascertaining them, for this person being accidentally brought for dissection, his previous history could not be traced.

Treatment.

Its existence might certainly have been ascertained by passing the finger up the rectum, but in the reducible or irreducible state nothing could have been done but to afford him temporary relief, by emptying the tumour when it pressed very heavily upon the rectum. If this hernia were strangulated, pressure might be made upon it from the rectum, and the intestine be possibly reduced, but I have no experience of this having been practised.

Mr. Bromfield gives the following curious case of this disease in his *Chirurgical Observations*, p. 264.

Mr. Bromfield's case.

“ A lad between six and seven years of age, was put under my care to be cut for the stone. The staff, in the attempt to introduce it into the bladder, met with resistance from a stone, which seemed to be lodged in the membranous part of the urethra, or a little lower down in the neck of the bladder: I made my incision as usual through the integuments and muscles, to get at the groove of the staff; I then pressed the blade of my knife into the sulcus at the extremity of the staff, being able to divide only the membranous part of the urethra, and a very small portion, if any, of the prostate gland: by the examination of the parts with my fingers, I then found that this hard body was a process continued from the body of the stone contained in the bladder; I therefore took the double gorgeret, without the cutting blade affixed, intending only to push back the stone, and to dilate the neck of the bladder, which I did, by getting the beak of the gorgeret into the sulcus of the staff, and pressing it against the point of the stone, following its course with the instrument as the stone retired: but the direction that the gorgeret took alarmed me, as it ascended under the ossa pubis with great obliquity: I then concluded that the instrument had taken a wrong route, as I could not in this case have the advantage of the groove of the staff farther than the extremity of the membranous part of the urethra; but on withdrawing the upper half of the gorgeret, I introduced the fore finger of my right hand into the bladder by the under part of the instrument, which remained in the bladder, and was now no more than the common gorgeret; by which I was soon convinced that it was in the bladder, whose situation was raised much higher in the pelvis than usual; I then introduced my forceps, and while I was searching for the stone, a *thin diaphanous vesicle like an hydatid appeared*,

rather below my forceps, which on the child's screaming, soon burst and discharged a clear water, as if forced from a syringe; the next scream brought down a large quantity of the lesser intestines. I need not say, that this was sufficient to embarrass a much better operator than myself; however, I proceeded in the operation with great tranquillity, being conscious that this very extraordinary event was not owing to any error in the operation; but the difficulty was to keep the intestines out of the cheeks of the forceps, when I should again attempt to lay hold of the stone; the extraction of which would be very difficult to effect, from the unusual situation of the bladder in this subject. The lower part of the gorgeret remaining in the bladder, the forceps were again easily introduced, which being done, with the fingers of my right hand I pressed back the intestines, and with my left supported the forceps. I then got an assistant to keep up the intestines while I laid hold of the stone; but during the extraction, the intestines were pushed out again by the child's screaming: nevertheless, as I had the stone secure in the forceps, I proceeded to extract it, which I did very easily. Before I introduced the common gorgeret, for the introduction of the forceps the next time, I got up the intestines again, and desired my assistant to keep them up till I got hold of a second stone, which I likewise extracted; and repeated the same process on account of another piece of stone, which from its shape appeared to be that which had got into the neck of the bladder. As soon as I was convinced by the examination with my finger that the bladder was totally freed from any pieces of stone, I again returned the intestines into the pelvis, and brought the child's thighs close together; a piece of dry lint was applied on the wound, and a pledget of digestive over it; he was then sent to bed with no hope of his surviving till the next day: but, contrary to expectation, the child had a very good night, and was perfectly well in a little more than a fortnight, without one alarming symptom during the process of cure; neither did the intestines ever once descend through the ruptured peritonæum, after they had been returned when the operation was finished."

Mr. B. proceeds to explain his ideas of the nature of this case.

"After the incision of the integuments and muscles was made, as usual, there soon appeared in the wound something like an hydatid, which proved afterwards to be that part of the peritonæum which is extended from the left side of the bladder and intestinum rectum to its attachment on the inside of the left os innominatum; by which attachment that part of the peritonæum, when in a natural state, does the office of a ligament, thereby preventing the lesser intestines from falling down too low in the pelvis; therefore, in this case, this expansion of the peritonæum must have been forced out of its usual situation.

"Suffering daily more and more extension, it will at length permit the intestines to fall down to the very bottom of the pelvis, between the bladder and rectum: therefore, when in the case above related the resistance of the integuments and muscles was taken off by the operation, the peritonæum was forced out, and at first was filled only with lymph, which gave it the appearance of an hydatid; but its thinness not being able to resist any longer the force of the abdominal muscles pressing the viscera downward, it burst, and the intestines soon followed through the aperture. If this is allowed, we can easily account for the oblique course that the gorgeret took when first introduced, as the intestines had raised up the fundus of the bladder against the back part of the ossa pubis, so that my forceps could not be conveyed into the bladder but almost in a perpendicular direction; and I was obliged to press with my hand on the lower part of the abdomen, just above the pubes, to bring the bladder and its contents sufficiently low for my laying hold of the last stone with my forceps."

In the female the existence of this disease may be ascertained by examination, either by the vagina, or by the rectum, as the tumour is placed between the two canals. Female.

Dr. Marcet, Physician to Guy's Hospital, read a paper at the Medical and Chirurgical Society of London, during the spring of 1803, containing an account of the dissection of a patient of his who had been six weeks in the hospital, and who laboured under vomiting and constipation for the greater part of that time, and when her body was examined after death, it was found that the uterus was retroverted without pregnancy, and the fundus uteri being turned into the space between the vagina and the rectum, had pressed upon the latter with so much force as to prevent the passage of the fæces. The preparation of this disease is preserved in the collection of morbid parts in Guy's Hospital. Dr. Marcet's case.

Dr. John Sims informed me, that he had been consulted by a lady who had been married several years, but had never borne children, and being desired to examine her, he found a swelling at the posterior part of the vagina, pushing the os uteri forwards. After long continued, but slight pressure, he succeeded in returning the tumour into the cavity of the pelvis, and the os uteri then resumed its natural situation. She soon after conceived, and has never since complained of those cholicky sensations under which she had laboured previous to the tumour being reduced. She has had, however, but one child, although this circumstance occurred four years ago. Dr. Sims's case.

Dr. Haighton, Lecturer on Midwifery at Guy's Hospital, informed me that he had seen an example of a tumour of this kind descending between the vagina and rectum. When pressed upon from the vagina, it protruded the rectum, if compressed from the rectum it forced the vagina through the os externum. Dr. Haighton's case.

Whilst the perineal hernia is capable of being reduced, it may be prevented from descending by the pressure of a pessary, which must be of large size.

Both this hernia and the vaginal may sometimes become dangerous during gestation, as the following case will prove.

Dr. Smellie was called to a woman, who about five weeks before she fell in labour had a tumour of this kind, which she had been previously able to reduce, increase to such a degree that she could not reduce it. The doctor found her in great agony; the tumour was

OF THE THYROIDEAL HERNIA;

OR,

HERNIA FORAMINIS OVALIS.

A CONSIDERABLE opening is left in the anterior and upper part of the thyroid foramen of the pelvis for the passage of a nerve, an artery, and a vein. Thyroid foramen.

This aperture is sometimes so incompletely filled by the vessels and nerve as to permit the descent of a portion of omentum or intestine, and the peritoneum lining the cavity of the pelvis is pushed down before it.

The only example which I have seen of this disease, is in the collection of preparations at Saint Thomas's Hospital, and in this case the hernial sac was so small that I doubted the propriety of including it amongst my plates. But when I considered that the danger of a hernia is proportioned rather to the smallness of its size than to its great magnitude, and that this small sac explains equally well with the largest the situation of the disease; and, moreover, when I considered that it is probable that this hernia seldom becomes of great size, I thought it right to introduce it. Example of a male hernia.

This hernia existed in a male subject, and was accidentally observed in making a preparation of an inguinal hernia on the same side.

It descended through the aperture in the ligament of the foramen thyroideum, above the two obturatores muscles.

The os pubis was placed immediately before the neck of the sac. Seat of.

Three fourths of it was surrounded by the ligament of the foramen.

The fundus of the sac was placed under the heads of the pectineus and adductor brevis muscles.

The size of the hernial sac within the thigh did not exceed that of a nutmeg.

The obturator or thyroid artery and nerve were situated behind the neck of the sac, and a little to its inner side.

In a paper of Mr. Garengéot's, in the Memoirs of the Royal Academy of Surgery at Paris, the following account is given from M. Duverney. "He found in the pelvis of a woman that he dissected two portions of intestine, which had forced the peritoneum through the superior part of the two oval or thyroideal foramina, and had formed two tumours, each of the size of an egg, between the anterior ends of the triceps muscles of each side; and as these intestinal tumours were not yet sufficiently advanced to produce a projection of the fat and skin which covered them, no tumour was perceived from without." p. 714, Vol. I. Case of.

Several cases of this disease are given in the same paper.

It requires that this tumour should be of large size before it can be detected by external examination; but it sometimes becomes of considerable magnitude. The author of the memoir above mentioned, gives a case to which he was called, of a woman who after a fall, felt an extremely violent pain at the upper part of the right thigh, near the labium pudendi, attended with vomiting, which continued three days. When Mr. G. examined her, he found a tumour on the inner and upper part of the right thigh, about a finger's breadth from the pudendum, and five or six inches in length. Raising the pelvis and knees, and rubbing the tumour with his hand from below upwards, the intestine was returned, and the tumour disappeared, the patient feeling at the same instant a gurgling sensation in the abdomen. The symptoms all ceased, and she had an evacuation in half a quarter of an hour afterwards. Memoirs of the Royal Academy of Surgery, Vol. I. p. 709. Reducible.

When this hernia is reducible the truss which would best answer the purpose of preventing the descent of the

Truss.

tumour, is that which I have described for the large crural hernia, only that the extremity of the pad must be much thicker, to make a deeper impression upon the thigh.

Operation.

With respect to its strangulated state, if the means which are recommended in other herniæ, viz. the taxis, warm bath, bleeding, and the tobacco clyster have failed, the operation of cutting the ligament which embraces the sac, is the only hope of preserving life. This operation must be extremely difficult, and so far as I am informed, it has never been performed. The only attempt, I believe, of that kind which has been made, is one mentioned in the memoir already alluded to by M. Malaval, who being called to a girl who had a hernia of the foramen ovale, attempted to reduce it, and succeeded in returning the intestine, but could not reduce the omentum. He advised her to apply to M. Arnaud, and the following operation was performed. The intestine was first reduced, after which an incision was made through the skin and fat to the hernial sac, which was opened, and a portion of omentum found of the size of a nut, which was cut away, as well as a portion of the sac, and the remaining part was pushed between the heads of the triceps muscle. This operation, he adds, succeeded; but it must be at once seen it was entirely unnecessary, for as the parts were not strangulated, a truss would have answered the purpose effected by this operation.

If the operation for this hernia, when strangulated, is ever performed, the division of the ligament of the foramen and the mouth of the sac should be made inwards, on account of the situation of the obturator artery.

OF VESICAL HERNIA;

OR,

HERNIA OF THE BLADDER.

IN the former edition of this work, the few opportunities which had presented themselves to me of observing this variety of hernia, induced me merely to allude to the disease as being occasionally met with in the form of an inguinal protrusion, rather than to advance speculations or opinions, the truth of which my opportunities had not enabled me to confirm by dissection. Subsequent experience, however, has afforded me the means of describing this disease, and of detailing the appearances which it presents on dissection.

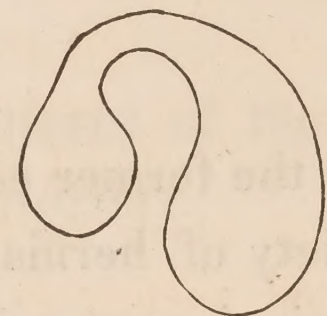
This variety of the complaint must be of comparatively rare occurrence, for I have only seen two instances of it in the living subject; but since the publication of the former edition I have been so fortunate as to have met with two opportunities of ascertaining the nature of this hernia by dissection. For the first I am indebted to Mr. Maiden, surgeon, of Stratford; and for the second case to Mr. Hallam, surgeon, at Walworth, who was so kind as to procure me permission to inspect the body of a patient whom he had long attended for a disease which ultimately proved fatal. This gentleman had frequently complained of a rupture, which upon careful examination, and from its symptoms, Mr. H. knew to be a hernia of the bladder. Rare.

The symptoms characterizing this species of hernia are the following. The size of the tumour varies as it does in the common forms of hernia; but the increase or diminution of its size is not much affected by the position of the patient's body, but depends more upon the accumulation or evacuation of urine in the cavity of the viscus. This variation of size, however, is not always observable, as the bladder does not always discharge the whole of its contents when the patient makes water; that part of the viscus within the pelvis completely emptying itself, while the portion within the scrotum remains distended as before the attempt to void urine. Persons therefore labouring under this complaint, are sometimes under the necessity of raising the scrotum and pressing upon it in order to force its contents into the pelvic portion of the bladder, by which means the whole volume of urine is discharged by the urethra. This imperfect evacuation of the bladder, to which these persons are liable, gives rise to another troublesome symptom—a very frequent desire to void the urine; for the part of the bladder within the scrotum, when imperfectly emptied, labours under a continued or frequently renewed sensation of distention, contracts upon its contents, impels the patient frequently to micturition, and thus gives rise to the symptoms of an irritable bladder. The fluctuating feel of the tumour in the scrotum might possibly lead to the suspicion of a common hydrocele, but in the cases which I have examined the tumour has not possessed transparency; this circumstance, together with the above symptoms, will sufficiently enable a surgeon to distinguish it from the latter disease. Symptoms.

In the dissection of the cases which I have had an opportunity of examining, the anatomy and the appearances were so similar as to render it unnecessary to give the history of both. The first case occurred in a patient of Mr. Maiden; I had been frequently requested to visit this gentleman for a ventral hernia, which was liable to become strangulated; and in my attempts to reduce it I accidentally discovered that he was also troubled with an inguinal hernia of the vesical kind; and as he had arrived at a very advanced period of life, I mentioned to a near relation that he was subject to another rupture of an incurable kind, and that it would be very desirable to ascertain its nature by dissection. This relative had the good sense to promise me an opportunity of examination, if it were in his power to procure permission, whenever he should fall a victim to the disease under which he at that time laboured. After a few years had elapsed he died, and the permission promised of inspecting his body was readily obtained by Mr. M. The hernia, together with the surrounding parts, I brought away, that I might have a better opportunity of dissecting them with care. Not long after the above case occurred, Mr. Hallam obtained permission for me to examine his patient; Mr. Thomas Blizzard also attended the dissection. Dissection.

A large inguinal hernia was perceived on the right side, which had descended into the scrotum so as to occupy its lower part; on removing the integuments, the fascia of the cord and the cremaster were seen spread over the part of the tumour, and both somewhat increased in density; these being removed, a hernial sac came into view, formed of peritoneum as in the common inguinal hernia, and not at all changed from its usual appearance. When the cavity of this hernial sac was laid open by incision, both omentum and intestine presented themselves; the bag in which they were contained was complete, and the bladder was still concealed. I then threw air in by the urethra in order to inflate the bladder; and immediately the bladder began to swell, not only in the pelvis but also in the scrotum behind the hernial sac, until it became as large nearly as an ostrich's egg. The bladder was situated behind the peritoneal sac, to the posterior part of which the anterior surface of the viscus closely adhered; posteriorly it was connected by cellular membrane to the scrotum and to the tunica vaginalis of the cord. On tracing it upwards it was found to ascend through the external abdominal ring into the inguinal canal, where it maintained the same relative situation to the cremaster and spermatic vessels as in the scrotum; it thence descended through the internal abdominal ring into the pelvis. It is almost needless to observe, that both rings, especially the inner ring, were much dilated.

Its form viewed anteriorly resembled the following outline; and in the plates I have given a lateral view of it, to render it as intelligible as possible. This disease has its origin in a relaxed state of bladder, and the protrusion is also probably favoured by neglect in regularly evacuating the bladder when required. The bladder thus becomes distended laterally, and spreads so as to occupy the lower part of the abdomen, and then reaches the inner abdominal aperture of the inguinal canal, through which it becomes forced by the weight and pressure of the superincumbent abdominal viscera, and the action of the abdominal muscles, diaphragm, and pyramidales. The following is the explanation of the peculiar peritoneal connexion which attends the vesical hernia. As the anterior and lateral parts of the bladder are in some degree devoid of peritoneal covering, the bladder at first enters the inguinal canal without bringing that membrane with it; but as soon as the fundus begins to descend, the peritoneum accompanies it; and with the sac thus formed, intestine and omentum afterwards protrude and produce the triple descent, of bladder behind the peritoneum, of intestine and omentum into the peritoneum, which the fundus of the bladder causes to descend.



Treatment.

The treatment consists in the application of a truss similar to that which is worn in the common inguinal hernia, and in paying unremitting attention to the frequent and complete discharge of urine. When the hernia is but small, and the bladder only has descended, the case will be more easy of cure than in a common hernia, because the contraction of the muscular coat of the bladder may lead to its being drawn out of the inguinal canal; whereas in common inguinal hernia the protruded parts are passive. But if it has so far descended as to bring with it the peritoneum, and intestine or omentum have descended into the peritoneal bag, the case will then be as difficult to cure as the common hernia. The vesical hernia only admits of cure by a gradual absorption, or an extreme elongation, of the adhesions which unite the bladder to the scrotum. I can hardly conceive the possibility of this hernia becoming strangulated so as to really require operation, unless a calculus has formed in the protruded part, and thus given rise to irritation, inflammation, and thickening of the parts.

A vesical hernia may also be a consequence of a previously formed femoral hernia of the common kind; for in a female of relaxed fibre I once saw the bladder drawn quite close to the orifice of an old femoral hernial sac. But the comparatively small size of the aperture in femoral hernia, and the unyielding nature of the parts which form it, explain the reason of its not being met with in practice.

Pudendal.

On the subject of protrusion of the bladder, Mr. Burn, of Glasgow, sent me the following communication, which he read to the Edinburgh Medical Society. It relates to the pudendal form of the disease.*

Case.

During the course of last winter, the body of a very old female was brought to the room for dissection. When the abdomen was opened and the small intestines removed from the cavity of the pelvis, the urinary bladder was found, when viewed from above, to have lost completely its natural ovoid appearance. This viscus lay stretched across the pelvis with its long diameter directed from side to side, in the place of from above to below; and in the middle part of the pelvis it was depressed so much as to protrude the upper surface of the vagina between the labia pudendi. At the sides, the bladder was pulled out into processes, which were traced descending like horns on each side of the vagina. When we had opened the bladder, it was clearly seen that the protrusion alongside of the vagina had taken

* In the ninth volume of the Edinburgh Medical and Surgical Journal is related an account of a peculiar displacement of the urinary bladder in pregnant women, by Mr. Christian:—During parturition, the bladder being pressed by the uterus either below the arch of the pubes or to one side of the pelvis, so diminishes the opening of the pelvis as considerably to impede the process of delivery.—Page 281.

A Hernia of the bladder protruding the vagina is also given by Sandifort.—Med. Com. vol. 5, page 257.

A case of vesical hernia in the scrotum is related by Mr. Keate, in his "Cases of Hydrocele, &c.," in which the spermatic vessels were found on the outer side of the tumour; but its relative situation to the epigastric artery is not mentioned.—Ed.

place on both sides from that portion of the shoulder of the bladder which is not invested by the peritoneum; consequently, in this species of pudendal hernia there is no peritoneal sac. By passing the finger into the cyst on the right side, I found that it followed the direction of the lateral part of the vagina, and was at last felt lodged in the labium pudendi, very near to the junction of the vulva with the perineum. As this position of the tumour was contrary to what had been observed by that accurate anatomist and excellent surgeon Mr. Astley Cooper, who first introduced pudendal hernia to the notice of surgeons, I filled the sac with baked hair, when it was felt like a ball in the labium, behind or below "a line drawn from the orifice of the vagina outwards." In this respect, therefore, it differed from the cases examined in the living subject, by Mr. Cooper, who found the tumour seated between the folds of the labium, "above a line drawn from the orifice of the vagina outward." In our subject, as in Mr. Cooper's patients, the tumour was of a pyriform figure, but it did not follow precisely the same course on both sides. On the right side the tumour passed into the labium, but on the left it followed the course of the tendon of the obturator internus muscle, and appeared, when the cyst was stuffed with hair, like a ball placed between the lower part of the vagina and rectum. On both sides the tumour lay between the levator ani muscle and the obturator internus. When we had ascertained these facts, I sent the pelvis to Dr. Monro, Jun., who had a drawing made from the parts; after which he transferred the preparation to Dr. Thomson, and Dr. Gordon, who dissected the tumour on the right side, as we had done on the left, and found that the protrusion had taken place between the obturator internus muscle and the levator ani. The neck of the cyst was seen closely embraced by the curved membranous origin of the levator ani muscle, which this dissection incontrovertibly proved would have formed the stricture had incarceration taken place. Even in this subject, where the tumour was still reducible, a very evident narrowing was seen at this part. There is at this point, from the tracing back of the bowel on the obturator internus, a natural tendency to strangulation; here, therefore, a very slight thickening of the protruded viscus would have produced complete incarceration. When we know the seat and cause of stricture in pudendal hernia, we shall be ready to allow, that from the mechanism of the deep seated chink through which the tumour passes, we may in performing taxis press, *ad infinitum*, on that portion of the cyst lodged in the labium without tending to reduce the parts. Before we attempt to replace the cyst the bladder must be emptied, and by pressure with one or two fingers in the vagina we must endeavour, if possible, to empty the tumour also. When we have done this, we are to place the patient in a recumbent posture, desiring her to lie on the side on which the hernia is seated; and then by regulated pressure upward and toward the spine of the ilium, by two fingers introduced into the vagina, we are to attempt the reduction of the cyst. In accomplishing this we shall be assisted by gently pressing the arms upward and inclining it to the side on which the disease is placed. This, it is hardly necessary to add, is done with the intention of relaxing the curved membranous origin of the levator ani, which in this disease is put on the stretch and forms the stricture.

On the left side of the same subject the protruded part of the bladder passed for some way between the sacro-sciatic ligaments, pushing before it the pudic artery and nerve. On this side, therefore, there might have been two sources of strangulation; one produced, as on the opposite side, by the fillet of the levator ani, and the other occasioned by the sacro-sciatic ligaments embracing the tumour.

At the time Mr. Astley Cooper published his splendid work on hernia it would appear that he was not acquainted with the existence of pudendal vesical hernia; all the cases which he had examined of pudendal hernia on the living subject having been intestinal. Mr. Cooper's remarks, therefore, on the operation, apply only to the latter species of the disease, for he directs the surgeon to open the sac; but in pudendal cystic hernia, as we have already observed, there is no herniary sac. This shews with how much caution surgeons should deliver their sentiments respecting operations till they have had an opportunity of examining by dissection the nature of the disease. As, in pudendal vesical hernia, there is no herniary sac, while in the same species of intestinal hernia there is a sac, it becomes a matter of importance to be able to distinguish the one disease from the other. It requires to be mentioned, that when the bladder is distended, the tumour in cystic hernia becomes prominent; that by discharging the contents of this viscus the cyst is rendered less tense; that by passing the finger along the vagina, and placing it on the neck of the tumour, the surgeon can by slight pressure empty it of its contents without perceiving any solid substance returning into the pelvis; and lastly, that along with these symptoms there is no disturbance of the intestinal function: where these phenomena are present there are strong grounds for believing that the disease is cystic hernia; in which case, as there is no sac, great care must be taken not to mistake the protruded bladder for a peritoneal sac, and thus to cut into it in expectation of reaching the gut. When we are to operate on a cystic pudendal hernia, the bladder, as Mr. Cooper very judiciously recommends in intestinal pudendal hernia, must be emptied; when this is done the surgeon is to make an incision through the integuments covering the labium; and that whether the tumour be seated in the labium or follows the course of the obturator tendon, provided it does not press between the sacro-sciatic ligaments, as it did on the left side in the present instance. By this incision the protruded viscus is to be exposed to view; and if the hernia be seated on the left side, the fore and mid fingers of the left hand are to be passed along the vagina. Next, a probe-pointed bistoury is to be conducted by the fore finger of the right hand along that side of the tumour next to the vagina, till it passes beyond the stricturing point, or the ligamento-tendinous origin of the levator ani muscle. When the bistoury is fairly fixed on this spot, with its cutting edge looking toward the centre of the pelvis, the surgeon is to turn to the right side the vagina and bladder with the fingers he had previously introduced into the former; and while he does this with the left hand he is, by retracting the right, to cut that portion of the levator muscle with which his knife is in contact. This is the plan which on the dead subject I have found most easily executed; but I must observe, that its performance is attended with some risk; for between the protruded and sound portions of the bladder there is little interposed, except the thin fillet of the levator ani; and, therefore, if the bistoury be carried too far toward the centre of the pelvis the shoulder of the bladder may be cut. Our chief safety depends on turning this viscus aside by the fingers in the vagina, and by inclining the cutting edge of the knife rather a little to the front of the pelvis. I have frequently tried this mode of operating on artificial cystic pudendal hernia, and have never injured any part of consequence. But I may add, that I believe, from a review both of the healthy and morbid parts, that in cystic and intestinal pudendal hernia, we shall rarely require to perform dilatation; but shall for the most part be able to reduce the parts when we have, by an incision into the labium, brought the tumour more under our control.

October 8, 1808.

OF THE ISCHIATIC HERNIA.

A rare disease.

THIS is either a very rare disease, or, from its producing but little, if any, external tumour, it has generally escaped observation; but I am inclined rather to believe the former, because, from the manner in which the lower extremity is dissected in the subjects brought into our dissecting-rooms, the muscles, nerves, and blood-vessels of the pelvis being generally traced, it could scarcely have escaped detection, if it happened frequently.

I am indebted to my friend, Dr. Jones, of the island of Barbadoes (who is well known to the public by his excellent treatise on the processes employed by nature in suppressing hemorrhage from divided and punctured arteries), for having an opportunity of dissecting the only case of this disease which has occurred within my knowledge: and as the Doctor watched daily the symptoms under which the patient laboured, an opportunity is given of comparing the symptoms with the appearances on dissection.

Dr. Jones informed me, that he had been inspecting the body of a man who had died of ischiatic hernia, and that he had found a small portion of intestine strangulated. After considerable difficulties the Doctor and myself opened the body a second time, and I removed the portion of the pelvis in which the hernia was situated, and which will be seen in plate XII. and XIII. of this work. I shall first give Dr. Jones's account of this case during his attendance, and then describe the appearances upon dissection.

Case.

"On the 18th of April, 1800, I was requested to attend a young man about twenty-seven years of age, who had been attacked a few hours before with nausea, retching, and violent pain in the epigastric region. His pulse was rather smaller and slower than natural, and his skin covered with perspiration. His employment was that of warehousekeeper to a respectable mercantile house in the city. He was not conscious of any cause to which he could attribute his symptoms, but said, that he had once before been attacked in a similar manner, though by no means so severely; and on that occasion, as soon as the disordered state of his stomach was relieved by tinct. opii, a dose of ol. ricini had effected his cure. He had taken fifteen drops tinct. opii about an hour previous to my seeing him; but as it had not afforded him any relief, and the symptoms continued very urgent, I ordered him a grain of opium made into a pill, with one drop of ol. menthæ pip. to be immediately given him; and as soon as his stomach appeared more quiet, to take the following medicine:

Calomel ppt. gr. v.

Pulv. scammon gr. viii.

Sapon opt. gr. vi.

Syr. simp. q. s. ut f. pil. tres.

"On seeing him at eight o'clock in the evening, I was informed that the opium had procured him ease for a short time, and had in some measure quieted and composed his stomach, though not sufficiently to enable him to retain the cathartic pills, which, with the opium, were therefore repeated that night, during which he slept but little, had occasional returns of retching, but no purgative effect was produced. The day following (the 19th) I found him troubled with frequent eructations, which he said inconvenienced him much, and requested I would give him something to remove them, as he now conceived flatus to be the cause of his pain. The following draught was therefore ordered to be taken immediately, and repeated, if found useful and agreeable to the stomach.

Spt. ammon. comp. dr. i.

Lavandul dr. i.

Aq. menth. sativ. oz. i. m. f. haustus.

"At nine in the evening he told me he had taken three of the draughts, and he imagined they had been of service to him; for though he had not been perfectly free from nausea and retching, yet he had been more composed and easy than usual. The eructation had quite gone off, and the pain, which had left his stomach, was now situated just below the umbilicus, and was not increased by slight pressure being made on it.

"I enquired of him if he ever had a rupture; he said he had not. No evacuation per anum having been yet procured, I ordered a laxative clyster with ol. ricini to be injected, and repeated, should the first prove ineffectual, after waiting a certain time; and that he should take another draught, with the addition of twenty drops of tinct. opii. Two enemata were administered, but each was immediately returned, without any discharge of fæces; he slept however rather better than on the former night. On the 20th, the pain below the umbilicus continued, but was not worse; he also complained of a sense of weight and fulness about the stomach. I again enquired of him if he was sure he had no rupture; he replied that he had not; however, as I felt myself very much embarrassed to

account for the obstinacy of his symptoms, and knowing that a protrusion may have taken place, sufficient to have occasioned them, but so small as to have escaped his notice, I requested he would allow me to examine him, to which he readily consented, and I cautiously examined the abdominal ring, and Poupart's ligament, on each side, and every part of the parietes of the abdomen, but found them perfectly free from hernia. As he did not complain of pain about the parts at which hernia is perceived, when it occurs at the foramen ovale, or ischiatic notch, I did not conceive it necessary to examine them.

"My attempt to procure evacuations by calomel and scammony having twice proved ineffectual, I determined to try an infusion of senna, which, without any other addition than a few prunes, he had been accustomed to take as a cathartic, and which I therefore should have prescribed for him at first, had not the extreme irritability of his stomach induced me to suppose, from its being more bulky and nauseous than the pills, it was less likely to be retained. In the course of this day he took nearly xij. oz. of a strong infusion of senna with prunes, taking small quantities at intervals; but neither did much of this remain on his stomach, although cataplasms of mustard were occasionally applied to the epigastric region, nor was any purgative effect produced. As he continued to complain of the sense of weight and fulness about his stomach, attended with constant nausea, and retching, more indeed than he did of the pain below the navel: and as the ordinary means had failed to give relief, I thought it might be advisable to encourage the disposition to vomit, and thus completely to empty the stomach; with this view he took twelve gr. pulv. ipecac. which however was probably immediately returned, as it produced no alteration either in his state or sensations. After this he took a composing draught, and I requested that some one else might be called to him. The next day, however (the 21st), when I went to see him, he said he found himself better, and had therefore considered it unnecessary to call in another person: he had passed a better night than usual, and imputed his apparent amendment to his having perspired very profusely: his pulse (except during some periods of langour, which had occasionally come on within the last twenty-four hours) continued as at first, rather small, and slower than natural, and he remained during the whole day more composed than he had hitherto been, but was not perfectly free from retching, and complained more of the pain below the umbilicus: six leeches were therefore applied to the part, by which a copious discharge of blood was obtained. In the evening two laxative enemata were thrown up, and were followed by two small evacuations of fæces, after which he took a composing draught, nevertheless, he got but little sleep; and on the 22d, finding he still complained of the pain (but not of its being worse), for he could bear gentle pressure on his abdomen, and it was not at all tense, a large blister was applied to the part, and the infusion of senna repeated, but without effect. In the evening, he complained very much of pain, which he imputed to the blister; the senna having proved ineffectual, the clysters were repeated, but not with much success, a very small quantity only of fæces being discharged. After three had been injected, the composing draught was repeated, but did not produce him a good night; and on the 23d I again desired some further advice might be had for him, but he told his friends he felt easier, and prevailed on them not to send for any other physician. In the course of the day he again took the draughts, in consequence of the recurrence of the eructation.

"On visiting him the next day, the 24th, I found him sitting up in bed: he informed me he had that morning taken some toast, and drank two cups of tea, which he had never before done during the whole of his illness: he said he found himself so well, that he had been inclined to go to business, but wished to consult me first. I advised him by no means to think of that for a few days. On feeling his pulse I found it so perfectly good, that it alone would not have given me an idea either that he had been, or was at that time, even indisposed: however, as he was much reduced, I ordered for him an infusion of serpentaria with tinct. cort. peruv. of which he took only two small doses. In the evening I heard from him, and was informed he continued as well as when I saw him in the morning, complaining only of weakness and soreness from the blister. He slept but little during the night, and between three and four o'clock in the morning of the 25th he got out of bed, and went below from his chamber, which was on a floor four stories high, but soon returned, said he felt very unwell, and from that time gradually sunk, till seven o'clock in the evening, when he died."

Dissection.—Having obtained permission to examine the body, on opening the abdomen it was found that the ileum had descended on the right side of the rectum into the pelvis, and that a fold of it was protruded into a small sac, which passed out of the pelvis at the ischiatic notch. In order to get at the part more conveniently, a ligature was made on the ileum, just at the place where it entered the pelvis, and around all the intestines above the pelvis: this gave a fair and ample opportunity of perfectly satisfying ourselves with regard to the nature of the case: after which the intestine was gradually withdrawn from the sac, in which it was rather firmly confined; and on examining the surface of that part which had been contained in the sac, it was found to have adhered at two points by coagulated lymph. The strictured part of the intestine, and about three inches of it on each side, were very black; the intestines from the hernia towards the stomach were very much distended with air, and had here and there a livid spot on them: there was also a dark coloured spot on the stomach, just above the pylorus. The colon, as far as its sigmoid flexure, was so rigidly contracted, as not even to admit the passage of air through it, but was of its natural colour, and the inflammation had scarcely extended to the cæcum.

Upon a careful dissection of the parts, after they had been brought to my house, we found a small orifice in the side of the pelvis, anterior to, but a little above the sciatic nerve, and on the forepart of the pyriformis muscle. When the finger was passed into this opening, it entered a bag situated under the gluteus maximus muscle, and this was the hernial sac in which the portion of intestine had been strangulated. The cellular membrane, which connects the sciatic nerve to the surrounding parts of the ischiatic notch, had yielded to the pressure of the peritoneum and viscera. The orifice of the hernial sac was placed anterior to the internal iliac artery and vein below the obturator artery, and above the obturator vein; its neck was situated anteriorly to the sciatic nerve, and its fundus, which was on the outer part of the pelvis, was covered by the gluteus maximus. Anterior to, but a little below the fundus of the sac, was situated the sciatic nerve, behind it the gluteal artery. Above, it was placed near to the bone, and below, appeared the muscles and ligaments of the pelvis.

Anatomy of this hernia.

If this hernia should in any case be obvious to the feel, and should be found reducible, a spring truss might be easily constructed to keep it within the pelvis. If it has become strangulated, and an operation is ventured to be performed, the safest direction in which the orifice of the sac can be dilated, will be directly forwards.

Treatment.

OF THE PHRENIC HERNIA.

Three causes.

PROTRUSIONS of the abdominal viscera through the diaphragm arise from three different causes.

First, natural apertures.

First, from this muscle, like the other parietes of the abdomen, being naturally formed with apertures for the blood-vessels and nerves. The aorta, the vena cava inferior, and the intercostal nerves have openings formed for their passage; and the œsophagus passes through a considerable aperture in its muscular part.

Second, malconstruction.

Secondly, a species of hernia is produced by a defect in the structure of this muscle, in consequence of which unnatural openings are formed, and a direct passage is given for the abdominal viscera into the cavity of the chest.

Third, wounds or lacerations.

And thirdly, wounds or laceration of the muscle sometimes occur, which remain open during the continuance of life, and allow of the protrusion of the abdominal viscera.

Symptoms; more of hernia and asthma.

From whichever of these causes the disease arises, its symptoms are particularly distressing, as in addition to the common symptoms of other hernia, viz. an interrupted state of the bowels, vomiting, constipation, and extreme abdominal pain, the patient suffers from the pressure upon the lungs great difficulty of breathing, and a very severe cough.

Sacs: some have them, others not.

Some of these herniæ are included in sacs, others are not; those which arise from gradual protrusion at the natural apertures have sacs, formed by the peritoneum and pleura; but of those which I shall describe, arising from malconstruction, some are contained in sacs, and others not, whilst those which arise from laceration are always without sacs.

First kind.

Rare.

With respect to that species of phrenic hernia, in which the viscera protrude through one of the natural apertures of the diaphragm, I have seen no example of it, and I believe it to be a rare occurrence. This probably arises from the bowels having to pass contrary to gravitation; for if such an opening as that which is formed for the passage of the œsophagus, existed at the lower part of the abdomen, protrusions would almost constantly occur, which is also confirmed by its being a more frequent occurrence in quadrupeds than in man; the position of their bodies being more favourable for its production.

Examples in Morgagni.

However, examples may be found in Morgagni of this disease. One is described, in which a part of the colon, and a still larger portion of omentum and pancreas were thrust through the passage which transmits the intercostal nerve.

Another case is mentioned in the same work, in which the person had a vehement cardialgia come on in the morning at break of day, attended with very frequent vomiting of an incredible quantity of blackish matter, and with straining to vomit, so that the young man died on the following night; and within the thorax was found, together with the omentum and intestine, the duodenum, with the jejunum, and a part of the ileum, so distended with that matter and with flatus, as to compress into a very narrow compass the heart and lungs, having been admitted into that cavity by the same foramen through which the gula (œsophagus) is brought down, this foramen being greatly dilated and deprived of its tone. (See Morgagni, Epist. LIV. Art. 13).

Second cause, malconstruction.

The second species of phrenic hernia, which arises from a malconstruction of the diaphragm, is a more frequent disease.

Children born with it.

It is not unusual to find in a child dying almost immediately after birth, a very large opening in this muscle, which permits the passage of the more moveable viscera into the cavity of the chest.

Cases at Saint Thomas's Hospital.

There are two preparations in the collection at Saint Thomas's Hospital of this disease. One of these has an opening so large as to permit the passage of the small intestines into the cavity of the chest, and in the other, although the muscle is less defective, a considerable part of the stomach was protruded. In each preparation the malformation appears in the left muscular part of the diaphragm, whence the viscera protruded into the left cavity of the chest. (See Plate).

Two cases of this kind are also related by Dr. George Macauley, in the *Medical Observations and Enquiries*, Vol. I. p. 25. In the first case, the child was a full grown boy, remarkably fat and fleshy; the child when first born, started and shuddered, so that the nurse apprehended his going into fits; he breathed also with difficulty, and it was some time before he could cry, and when he did, there was something particular in the note. The child seemed to revive a little in about half an hour, and breathe more freely, but soon relapsed, and died before he was an hour and a half old. Upon dissection, when the sternum was raised, the stomach, and greatest part of the intestines, with the spleen, and part of the pancreas were found in the left cavity of the thorax, having been protruded through a discontinuation, or rather an aperture of the diaphragm, about an inch from the natural passage of the œsophagus.

Dr. Macauley's
cases.

From the extraordinary bulk of the parts contained in the left side of the thorax, the mediastinum, the heart, the œsophagus, and the descending aorta, were forced a considerable way towards the right side, and the left lobes of the lungs were not larger than a small nutmeg, and about two-thirds less than the right, though neither of them were diseased. The viscera being replaced in their natural situation in the abdomen, there was found a large chasm or hole in the diaphragm on the left side, through which the parts might freely pass into the thorax. From its appearance, as well as from that of the other parts, it seems extremely probable that in this case, there was an original malconformation of the diaphragm, by which means the abdominal viscera had very easily slipped into the thorax, because there was not the least mark of rupture, or inflammation about the edges of this opening, and the diminished size of the left lobes of the lungs, of the heart, and the mediastinum, and their inclination towards the right side seemed to be produced by a gradual enlargement of the protruded abdominal viscera, increasing with the growth of the foetus.

In the second case, the child was a female; it first breathed with great difficulty, cried once feebly, sighed for about three quarters of an hour, and expired.

This case is the reverse of the former, as the abdominal viscera had passed into the right side of the thorax. In both the displacement of the abdominal viscera seemed to be owing to an original malconstruction of the diaphragm, and not the effect of rupture or violence.

As the lungs perform no very essential part of the foetal economy, whilst children so constructed remain in utero, the imperfect state of the diaphragm does not interfere with the functions necessary to that state of existence, and therefore these infants are perfectly formed in other respects; but when respiration begins, the great size of the opening of the diaphragm will allow the abdominal viscera to be forced into the chest in such quantity as to compress the lungs and destroy life.

Of no consequence
during the foetal
life.

When this unnatural opening of the diaphragm is small, the consequences are not so immediately fatal. It produces at first some inconvenience, which increases in the progress of life, and at length destroys, as in other hernia, by a strangulation of protruded parts.

I shall take the liberty of extracting two cases, which I published in the year 1798, in the *Medical Records and Researches*, in which an opportunity was given of combining the appearances upon dissection, with a short history of the symptoms which the complaint produced during life.

This disease was discovered in a subject brought to Saint Thomas's Hospital for dissection, where a preparation made from it is still preserved.

Sarah Homan, aged twenty-eight, had from her childhood been afflicted with oppression in breathing. As she advanced in years, the least hurry in exercise or exertion of strength produced pain in her left side, a frequent cough, and very laborious respiration.

Case.

These symptoms were unaccompanied with any other marks of disease; and as her appetite was good, she grew fat, and, to common observation, appeared healthy. The family with whom she lived suspected her of indolence, and her complaints being considered as a pretext for the non-performance of her duty, she was forced to undertake employments of the most laborious kind.

This treatment she supported with patience, though often ready to sink under its consequences. After any great exertion, she was frequently attacked with pain in the upper part of the abdomen, with vomiting, and a sensation, as she expressed it, of something dragging to the right side; which sensation she always referred to the region of the stomach.

The cessation of these symptoms used to be sudden, as their accession; after suffering severely for a short time, all pain and sickness ceased, and allowed her to resume her usual employments.

As her age increased she became more liable to a repetition of these attacks; and as they were also of longer continuance than in the early part of life, she was at length rendered incapable of labouring for her support.

Some days previous to her death she was seized with the usual symptoms of strangulated hernia, viz. frequent vomitings, costiveness and pain; the pain was confined to the upper part of the abdomen, which was tense and sore when pressed.

As these symptoms were unaccompanied with any local swelling which indicated the existence of hernia, they were supposed to be produced by an inflammation of the intestines; but there were other symptoms that could not be attributed to this cause, which occasioned much obscurity with respect to the true nature of the complaint, and seemed to indicate a disease in the thorax. She was unable to lie on her right side, had a constant pain in the left, a cough, and difficulty of breathing, attended with the same dragging sensation of which she had formerly complained.

The signs of inflamed intestines, with the addition of a troublesome hiccough, continued without any abatement for three days, when she expressed herself better in these respects; but the morbid symptom in the thorax remained as violent as at first, and in the fourth day from their commencement she expired.

Dissection.

When the abdomen was opened, there appeared a very unusual disposition of the viscera.

The stomach and the left lobe of the liver were thrust from their natural situation towards the right side.

On tracing the various convolutions of the small intestines, they were found to retain their usual situation; but lines of inflammation extended along such of their surfaces as lay in contact. This appearance the adhesive inflammation assumes in its early stage, and it is highly probable that if the approach of death had been less rapid, these surfaces of the intestines would have been glued together by the effusion of coagulated lymph.

When the large intestines were examined the great arch of the colon, instead of being stretched from one kidney to the other, was discovered to have been pushed into the left cavity of the chest, through an aperture in the diaphragm.

The cæcum and beginning of the colon were much distended with air, and appeared, therefore, larger than natural; but the colon on the left side, as it descended toward the rectum, was smaller than it is commonly found.

A small part only of the omentum could be discovered in the cavity of the abdomen, a considerable portion of it having been protruded into the chest through the same opening by which the arch of the colon had passed.

The displacement of the stomach and left lobe of the liver, had arisen from the altered position of the colon and omentum, which, in their preternatural course towards the diaphragm, occupied the situation of each of these parts.

When the chest was examined, the left lung did not appear of more than one-third of its natural size; it was placed at the upper part of the left cavity of the thorax, and was united to the pleura costalis by recent adhesions.

The protruded omentum and colon were found at the lower part of the left cavity of the chest, between the lung and the diaphragm, floating in a pint of blood coloured serum. The colon in colour was darker than usual, in texture softer, distended with fæculent matter mixed with a brownish mucus. The portion of the intestine contained within the chest measured eleven inches.

The omentum was also slightly altered in its colour, being rather darker than natural; but in other respects this viscus was not changed: it adhered firmly to the edge of the aperture, and more than half of its substance was contained within the chest.

The opening through which these viscera had protruded was placed in the muscular part of the diaphragm, three inches from the œsophagus: it was of a circular figure, and two inches in diameter; its edge was smooth, but thicker than the other parts of the muscle.

The peritoneum terminated abruptly at the edge of this aperture, so that the protruding parts were not contained in a sac, as in cases of common hernia, but floated loosely, and without covering, in the cavity of the chest, of which they occupied so large a space, as to occasion considerable pressure on the left lung, and to produce the diminution I have before remarked. The right side of the chest, and the right lung, were free from disease, and the heart was in a sound state. (*See Plate*).

When the size of the opening, and the importance of the diaphragm, as an agent in respiration, are considered, it seems singular that this disease had not proved fatal at an earlier age; but it is probable that the aperture was originally small, and had been gradually enlarged by the protrusion of the abdominal viscera.

Before it became thus dilated, it was probably closed in common inspiration by pressure from some abdominal viscus, most likely by the omentum, as this part adhered firmly to its edge. But under the deeper inspirations consequent upon extraordinary exertions, the abdominal viscera, instead of simply covering the orifice, were forced into it, and then becoming compressed by its edge, slight symptoms of strangulation succeeded; hence the sickness, pain, and the dragging sensation of which she so frequently complained. The situation of the aperture however favoured the descent, and consequently, the return of the protruded parts into the abdomen; the symptoms, therefore, though they so frequently recurred, remained only for a short time, and then suddenly disappeared.

By these frequent protrusions the opening became gradually enlarged, whence she was rendered more liable to subsequent attacks of pain and sickness, because the viscera entered the chest with greater ease and in larger quantities. At length a large proportion of the omentum and intestines was forced through the opening; their bulk prevented their return, and the pressure of the edge of the opening occasioned inflammation in the protruded intestine, and all the common symptoms of strangulated hernia; and by pressure on the lungs, produced oppression in breathing, pain in the left side, and a difficulty in lying on the right.

Dr. Clarke has lately published in the Transactions of the Society for the improvement of medical and surgical Knowledge a case of a similar kind; and Dr. Monro, Junior, has related one in his Treatise on Crural Hernia.

It will be difficult in the living subject to decide on the nature of this disease; yet the judgment may be directed in some degree by the combination of symptoms of strangulated hernia with those of an oppression on the chest; that is to say, by vomiting, costiveness, hiccough, pain and tension of the abdomen; together with cough, oppressed breathing, and inability to lie on one side.

Little could be done for the relief of such patients, even if the disease were certainly known, except by strongly recommending that quiet, which indeed their own feelings will prompt them to adopt. But hard must be their lot, if they are placed under the circumstances of this young woman, obliged to labour under unfeeling employers, who suspect the sufferings she described to arise from a disposition to indolence.

If the deficiency in the diaphragm is unaccompanied by a defective state of the peritoneum and pleura, these membranes form a double covering to the protruded parts, as the following example will prove.

My friend, Mr. Bowles, an ingenious surgeon at Bristol, has transmitted to me the following account of the dissection of a man in whom a protrusion was discovered of a part of the abdominal viscera into the cavity of the chest. It differs from the foregoing case in the disease being placed on the right, instead of the left side, in the

contents being free from strangulation, and in having been inclosed in a sac, instead of floating loosely in the cavity of the thorax.

He states, that in the month of October, 1796, he opened the body of a man aged fifty years, who had died from excessive vomiting after the use of an emetic, and in whom the viscera of the cavity of the abdomen were found disposed in an unusual manner. Of the omentum only a small part could be seen; and the right extremity of the stomach, as well as the arch of the colon, had entirely disappeared. Mr. Bowles' case.

On inspecting the thorax, a sac considerably larger than a tennis-ball was found in its right cavity, which contained the right extremity of the stomach, and beginning of the duodenum, a part of omentum, and the arch of the colon, which last was disposed in several convolutions.

The sac was formed by the united membranes of the pleura and peritoneum, and its orifice was placed at a small distance from the right side of the ensiform cartilage, where there appeared a deficiency of fibres in the larger muscles of the diaphragm corresponding to the size of the sac.

The parts which formed this hernia exhibited no marks of inflammation, were free from adhesion, either to each other or to the sac, and could be returned without difficulty into the cavity of the abdomen.

The right lung was much smaller than usual, its anterior and inferior part having been compressed by the tumour. The other thoracic viscera appeared to be in a healthy state.

The stomach being next examined, was found to contain a number of peas, which he had taken in some broth just previous to his death, and a deep coloured mucus adhered to its inner surface, which, when removed, exhibited the internal membrane of the left extremity highly inflamed; an appearance which had probably arisen from the violent operation of the emetic, and appeared to be the immediate cause of his dissolution.

Mr. B. could learn nothing important of this man's history, but that he had, at various times, laboured under asthmatic complaints, which admit of an easy explanation from the appearances on dissection. No violence could be traced capable of producing so great a change of structure, and it seems therefore probable that it had arisen from original malconformation.

A wound or laceration of the diaphragm is the third cause of protrusion of the viscera into the chest. Wounds with the small sword have been the most frequent causes of this disease; the opening made in the diaphragm being prevented from closing, by the pressure of the abdominal viscera, protrusions immediately occur, and gradually increase the size of the opening, so as at length to give passage to large portions of viscera. But in this country such weapons being scarcely worn, wounds of this kind hardly ever occur. The only accident I have known produce this species of hernia has been a laceration of the diaphragm, occasioned by the fracture of several of the ribs. Third cause.

The following case will illustrate the nature of this disease.

William Rattley, aged thirty years, was admitted into Guy's Hospital, February 5, 1804. He had been a strong healthy man before this time, but in painting the mast of a ship he fell from the height of thirty-six feet, and pitching with his back on the edge of the pump, he broke six of the lowermost ribs of the right side. His symptoms were extraordinarily severe; he breathed with great difficulty, and complained of excessive pain in the right hypochondrium; and upon examining his back, a crepitus at the fractured ribs could be felt, and a slight emphysema was observable. He was admitted at one o'clock in the afternoon, he vomited violently, and had frequent hiccough in the evening, and at eight o'clock on the following morning he expired. Case.

Upon opening the cavity of the chest (which was done by my house-pupil, Mr. Travers), no unnatural appearance of the lungs was observable, excepting some slight and recent adhesions of its surface to the pleura on the right side, and a small and partial wound at the lower and posterior part of the right lung. On pushing down the vault of the diaphragm, a fold of intestine of a livid colour was discovered, and upon extending the examination into the cavity of the abdomen, a portion of intestine, which proved to be ileum, was found proceeding upwards behind the liver into the cavity of the chest, through a large opening of the diaphragm. This opening, which appeared lacerated, was situated about two inches from the cordiform tendon, in the muscular portion of the diaphragm, and on its right side. The aperture was filled by the intestine, around which a very firm stricture existed. It had been strangulated by the muscle itself; and from the livid state of the intestine only nineteen hours after the accident, the strangulation seemed to have been unusually complete. The hole in the diaphragm had been occasioned by the broken point of the tenth rib, which had penetrated the muscle when it was in a state of expiration, and the muscle had withdrawn itself from the point of the rib in inspiration, so as to leave the opening through which the intestine had protruded. The viscera in the cavity of the abdomen appeared little altered in any other respect, but about a quart of bloody serum had been extravasated into both cavities. (*See Plate.*) Dissection.

Mr. James Simpson, of His Majesty's ship Victory, in the year 1812, communicated to me a case of phrenic protrusion arising from a fall, which ruptured the tendon of the diaphragm.

The patient was a man twenty years of age. He fell from the gang-way into the waist of a third rate (the distance being about six feet), on his left side; when he immediately complained of pain in that part, attended with frequent and painful efforts to vomit; and at times he ejected the contents of his stomach, particularly when any diluent drink was given. The pulse was very weak, and a few days Case.

after the accident scarcely perceptible; the extremities were very cold; he was very restless, and had no stools unless when cathartic enemata were administered: the respiration was also impeded.

This accident happened on the 3rd of April, 1811, and twenty-four hours afterwards he was received into His Majesty's hospital ship *Sussex*, at Sheerness, (at which time I was an assistant surgeon of that ship), when the above symptoms were observed, but had existed from the beginning according to the statement given by the surgeon of the ship to which he (the patient) belonged; and they continued to increase till the eighth day of the same month, when he expired.

On examination of the body there was found a rupture of the tendinous part of the diaphragm, about three inches in diameter; through which the stomach and part of the duodenum protruded into the left cavity of the thorax, which corroborates the opinion that the tendinous part of every muscle is decidedly the strongest in the dead body, although often found to be the weakest in the living. The stomach was very much distended, apparently occupying the whole of the left cavity of the thorax; the lungs of this side were of a much smaller size than usual, so that the action of them and the heart must have been greatly interrupted.

The small and large intestines were collapsed, except that part of the duodenum which was contained in the thorax; there was a small gangrenous spot on the convex part of the stomach, which had arisen from the pressure of the diaphragm on that part. There was no appearance of any external injury.*

Dr. Leacock, while a student at Edinburgh, made the following notes of a case of diaphragmatic protrusion, which he has had the kindness to transmit to me.

Case.

James Morton, a blacksmith, aged forty-nine, was admitted on the 15th of January, 1815, into the infirmary of Edinburgh, with severe pain of the abdomen, particularly of the epigastric region, which was augmented by the slightest pressure or motion of his body. He was affected also with vomiting of whatever was received into the stomach, with rigors, and a tendency to syncope on the slightest exertion. His countenance expressed much pain; he lay generally on the side with his knees drawn up towards the abdomen; his breathing was quick and anxious; pulse 60, very small and weak; tongue clean and dry; thirst excessive; belly reported to be regular; urine had not been passed for some hours; the surface was covered with perspiration.

The pain of his epigastrium had been of four or five hours standing. Upon its first coming on he took a glass of whiskey, which procured him temporary relief. Vomiting, however, soon supervened, the pain recurred more severe than before, and gradually increased. He could assign no cause for his complaints, except that he had drank strong ale the night before. Had used no medicine but a dose of salts, which he vomited up.

He was now bled to twenty oz.; he had ol. ricini one oz. given to him, and an enema. At eight o'clock, P. M. the pain was but little if at all relieved,—it had extended itself over the abdomen. Vomiting had abated; the pulse was rather fuller; thirst still urgent; one scanty alvine evacuation was produced, but little of the injection was received; the bleeding he bore well; it was now repeated; a blister was applied over the whole abdomen; the enema was repeated, and the decoct. avenæ used as drink.

At twelve o'clock the pain was reported not to be relieved, although he appeared to endure pressure better than before, nor did his countenance express so much pain. He lay with his legs more extended, and he moved about more freely. Vomiting still occasionally recurred; his pulse was 134, fuller and stronger; no alvine evacuation had been procured. When sixteen oz. of blood were drawn he had a tendency to faint; the blood was not sizzly.

Venesection was again repeated; the enema also, and a fourth part of the following mixture given every hour:—Aq. menthæ, ol. ricini, aa. oz. i. f. s. : aq. potassæ gt. x. f. mist.

On the sixteenth, at eight o'clock A. M. he expired. Sixteen oz. of blood had been drawn, which was not sizzly. During the night he became very restless, and a small quantity of dark coloured matter was passed by stool.

Dissection.

Upon laying open the cavity of the abdomen the stomach was seen immensely distended, with the spleen lying on its upper and fore part, immediately below the ensiform cartilage, and a little to the left side. On farther examination it was found that the stomach was completely twined round; that the cardiac extremity with the spleen attached to it had been turned to the right side, and the pylorus somewhat near to the situation of the cardia,—the anterior surface being thus made the posterior. The pyloric portion, the arch of the colon, and the omentum, could not be found in the cavity of the abdomen. On putting the finger down beneath the small curvature of the stomach, it seemed as if part of the bowels had protruded through the diaphragm. On opening the left cavity of the thorax, a hole about two inches in diameter was found in the left muscular portion of the diaphragm, near the vertebræ, through which were protruded about half of the pyloric extremity of the stomach, the whole arch of the colon, and the omentum. These were in contact with the lung and the pericardium, and were in a highly inflamed state; the colon exhibiting that dark appearance which takes place in strangulated hernia. The omentum had contracted some adhesions to the parietes of the aperture through the diaphragm; the other viscera were loose. The stomach contained about seventy or eighty ounces of a dark coloured, peculiarly fœtid fluid, with seemingly pieces of undigested cheese; the other abdominal viscera were sound. The left lung was very much diminished, but apparently of a healthy structure. A few ounces of fluid were found in the cavity of that side.

* In the nineteenth volume of the Edinburgh Medical and Surgical Journal is related a case that occurred under the observation of Mr. Macfadyen, of Glasgow, in which the stomach, omentum, and transverse arch of the colon protruded into the left thoracic cavity, through an aperture about the cordiform tendon. The symptoms of strangulation came on immediately after the patient had swallowed a copious draught of cold fluid; but the opening in the diaphragm is referred (and it would appear correctly) to laceration in consequence of a severe fall the man had sustained twelve months before.—ED.

OF THE MESENTERIC AND MESOCOLIC HERNIA.

THE mesentery is composed of two layers of peritoneum, between which the blood-vessels, absorbents, and nerves are situated, which are distributed to the small intestines; and these layers are united together by a cellular membrane of tender texture.

Mesentery formed of two layers.

If in consequence of a blow upon the abdomen, one of these layers of peritoneum is torn, and the other remains in its natural state, the intestines will force themselves into the aperture, and form, according to my idea of the disease, a true hernia, since the intestine is protruded out of its proper cavity. Or if either of these layers is originally formed defective, so as to leave an aperture in one of them, the same effect will ensue.

Aperture in one of these.

Which of these circumstances is the cause of this disease, it is not in my power to determine; but I am disposed to believe, that it has its source in an originally defective structure, as in the case which I examined, there were no marks of preceding violence, but the parts had in all respects, excepting in the existence of this disease, their natural appearance. In whichever way the disease occurs, it shews strongly the degree of pressure which the bowels exert upon every point of the parietes of the cavity in which they are contained, for otherwise it would be impossible that all the small intestines should be forced out of their natural situation through a small opening in a moveable portion of membrane.

Occasioned by malformation.

But when the protrusion has once began, there is no difficulty in conceiving how it will increase to the extent necessary to receive all the small intestines, as the cellular membrane which unites the two layers is not sufficiently strong to resist any considerable degree of pressure.

The plate which I have given of this disease, was taken from a drawing made by Mr. Kavanagh, of Walthamstow, who was then a pupil at Saint Thomas's and Guy's Hospitals.

The disease was found in a subject brought to Mr. Richard Pugh, of Gracechurch Street, for dissection at Saint Thomas's Hospital, and the man had been a patient in Guy's Hospital under Mr. Forster, and had suffered the operation of amputation; he appeared to be about fifty-five years old.

When the abdomen was opened for demonstration, and the omentum and colon were raised, the small intestines did not appear, but in their stead, in the middle of the abdomen was found a tumour situated upon the lumbar vertebræ, and extending down to the basis of the sacrum. When this tumour was opened, it was found to be a sac containing all the small intestines, excepting the duodenum.

Situation of the tumour.

Mr. Pugh was so obliging as to give me the body for further examination. I found that the sac was formed by the peritoneum, which completely surrounded the intestines, excepting at the posterior part, where there was a small hole by which the intestines had entered. Tracing the intestine from the stomach towards the anus, the beginning of the jejunum was found passing into the sac at the posterior part, and by the same opening the ileum passed out on the right side, and descending to the right inguen, it entered the large intestines in the usual manner.

Its contents.

I injected the mesenteric vessels, and in the preparation they have been dried without dissection, but from their wanting their usual covering of peritoneum, they are as distinctly seen as they usually are after a minute dissection.

What effects during life this unusual position of the intestines had produced I could not ascertain. Every inquiry was made, but nothing had happened during the time the patient was in the hospital that could lead to a suspicion of any disease having existed in the abdomen. However, from the confinement the intestines had suffered within the bag, I should naturally be induced to conclude, that the peristaltic motions of the bowels had been less free than usual, and that from this torpid state of intestine frequent constipation would have arisen; but if

this was the effect, it had never gone so far as to produce inflammation, as the intestines did not appear thickened, and had not contracted any adhesions either to the sac or to each other.

Mesocolic hernia.

The plate of mesocolic hernia is taken from a preparation which was made many years ago*, and which is deposited in the collection at Saint Thomas's Hospital.

Seat of.

On opening the abdomen of a subject brought there for dissection, the omentum and large intestines being turned aside, a large tumour was discovered on the left side of the abdomen, its upper part resting on the left kidney, whence it extended downwards to the brim of the pelvis, its lower part lying in the fold of the sigmoid flexure of the colon.

Contents.

The large intestines took their usual course in the abdomen, excepting that the cæcum and beginning of the colon were placed nearer to its centre. On the left side the colon was placed between the tumour and abdominal muscles, and the swelling reached from the termination of its great arch to its sigmoid flexure.

The duodenum, a small part of the jejunum, and the termination of the ileum, were the only portions of the small intestines which were visible.

Upon examination of the tumour, it was found to contain all the small intestines which were not seen on first opening the abdomen, and the orifice, by which they had passed into the tumour, was situated on its right side. This orifice was more than sufficiently large to permit the passage of two folds of the intestines even in their most distended state, and through it all the small intestines were readily drawn from the bag.

Sac.

The sac in which they were contained was formed between the laminae of the peritoneum of the mesocolon, in the anterior layer of which on the right side, was placed the opening by which the intestines had entered. The bag was sufficiently large to be capable of containing all the small intestines in a half distended state. Two-thirds of the orifice of the sac were formed of peritoneum only, and one-third was covered by a branch of the inferior mesenteric artery. The peritoneum which formed the sac was somewhat thicker than that which was contiguous to the abdominal muscles, but, upon the whole, it had undergone less alteration in that respect, than the degree of pressure which it had sustained would have led me to expect.

No strangulation.

When the intestines were very much distended with air or food, the opening into the sac was sufficiently large to allow of the escape of a part of them into the abdomen; but if the orifice had by pressure become thickened or contracted, the patient might have suffered the symptoms of strangulation.

These symptoms, however, in this species of hernia are not very likely to occur, for a contraction and thickening of a hernial sac, are generally produced by some pressure external to the sac resisting that from within, and thus therefore it happens, that the sac in inguinal hernia is sometimes contracted opposite to the two openings from the abdomen; but in this case there is nothing but the thin substance of the peritoneum to resist the pressure from within, and the orifice of the sac will yield so readily to the bowels, that no considerable compression of the contents would have been likely to occur. There was no appearance in this case which could lead to a belief that the symptoms of strangulation had ever occurred, nor was it probable that the person experienced so much torpor of bowels as in the case of mesenteric hernia which I have before described, as the passage into the bag was much more free; but we had to lament in this case, as in the former, that no opportunity was given for ascertaining the symptoms which this disease had produced.

A posterior view of the colon is given in the plate, as it was concealed by the tumour in an anterior view.

* In the year 1797.

OF

STRANGULATION OF THE INTESTINE

WITHIN THE ABDOMEN.

THE intestines are sometimes found incarcerated within the abdomen, in consequence of the three following causes : Causes of.

First, From apertures in the omentum, mesentery, or mesocolon, through which the intestine protrudes.

Secondly, From adhesions having formed in consequence of inflammation, leaving an aperture, in which a portion of intestine becomes confined.

Thirdly, By membranous bands forming in the mouths of hernial sacs, which becoming elongated by the frequent protrusion and return of the viscera, surround the intestine so as to strangulate it within the abdomen, when it is returned from the hernial sac.

Of the first of these causes I have been favoured with the following account by Mr. Palmer, who was one of the most assiduous of our students.

Hereford, 1805.

Dear Sir,

I have at length, according to my promise, transmitted you the particulars of the strangulated intestine, the preparation of which I sent you during the last winter.

I am, &c.

HENRY JONES PALMER.

On the 22nd of April, 1804, * I was requested to attend Mrs. Ann Davis, who had been attacked the preceding day with bilious vomiting, which was immediately succeeded by an utter incapability of retaining any thing upon her stomach, either in a solid or liquid form : she complained of a slight pain in the epigastric region ; her pulse was quick and small, the temperature of her skin was rather increased, and there was very considerable tension of the whole of the abdomen ; she had not had any evacuation for several days : the primary object under these circumstances was, to obtain a speedy passage through the bowels, and with this view I ordered a laxative clyster to be administered, which operated in a very inconsiderable degree ; I therefore prescribed a strong mercurial cathartic, and an aperient mixture ; a given proportion of each was directed to be taken every four hours. Repeating my visit early in the following morning, I found my patient nearly in the same state as that in which I had left her ; the belly was still tense and incompressible ; the medicines had not operated, and she continued to reject every thing that she swallowed. In this stage of the case Dr. Blount was consulted, who recommended a continuance of the mercurial and aperient medicines, and an occasional repetition of the clysters ; castor oil alone, and combined with senna and julep, were also had recourse to, but not the least relief was obtained. The warm bath, saline draughts in a state of effervescence, conjoined with opium, and blisters applied over the stomach, were each resorted to, and several times repeated, with a hope that they would tend to diminish, if not entirely arrest the incessant vomitings : in this respect we were unfortunately disappointed ; indeed every possible means we could devise, either to induce evacuation, or allay the extreme irritability of the stomach, proved equally ineffectual. In this lamentable state she remained, without experiencing scarcely a momentary intermission of these distressing symptoms, till the 30th, when an evident alteration for the worse took place : a considerable quantity of fæculent matter was now discharged in the act of vomiting ; her pulse became quicker, hurried, and wiry, and her extremities cold ; the parietes of the abdomen were more flabby and yielding. Though too well assured that this alarming change was the certain prelude to approaching dissolution, I considered it a duty incumbent upon me to do every thing in my power, whilst the vital spark existed ; as a last and hopeless resource, therefore, some æthereal cordial was given, which however almost instantly returned, and in the course of four hours she expired.

Mr. Palmer's case.

* The above case is collected from my father's case-book.

Upon inspecting the state of the abdomen, the immediate seat of the disease for some time eluded detection, owing to the collapsed state of the intestines; but upon a more accurate and minute examination an opening was found through the mesentery forming a stricture, inclosing the inferior portion of the ileum, and which decidedly and sufficiently accounted for the melancholy termination of the case.

In the plate the strangulated portion of intestine is engraved of a darker colour than it should have been, as the intestine was not much discoloured.

Dr. Monro, junior, gives an account of a similar case in his work on Crural Hernia.

Mr. Richard Croakes, surgeon, of Barnsley, Yorkshire, sent me the following narrative of a case which he had attended and inspected.

Mr. Croakes's case.

I was called up about one o'clock on Thursday morning, (Feb. 23, 1804), to visit Mr. Wade, (a farmer at Lewdon, about two miles from this town), aged eighty, of spare habit, and who had, previous to this attack, enjoyed a good state of health, and led a very active life. He complained of very acute pain in his abdomen, which he had had for three or four hours, chiefly about the umbilical region (unattended with sickness, or any degree of fever), which he supposed was occasioned by a little ham he had eaten for his dinner (about one o'clock) the preceding day, which was not sufficiently boiled; and I, not being able to discover any other existing cause at the time, coincided with him: but on further inquiry after death, was informed, that the day before, when attempting to mount his horse, he was thrown down, but did not complain of any inconvenience from this accident at that time. As he had no vomiting, I thought it best, on account of his age, not to give him an emetic (bleeding was also thought of, but omitted for the same reason), but I sent him a cathartic mixture; about noon I was again sent for, and the messenger informed me he had rejected every thing. I then gave him an emetic, but it only brought away the liquid he had taken with it; a clyster was then administered, which operated very well, but still the pain and sickness continued. He had then two grains of opium, and I left him some pills, with four grains of calomel in each, and ordered him to take one every two hours till they operated; but when I again saw him, whatever he had taken had been rejected, and I was again called up in the night, and Dr. Dow accompanied me, who had him put into a warm bath, and repeated the cathartic mixture, but with no better success than before: he had then his feet put into hot water, and the clyster repeated, castor oil given, a large blister applied to the abdomen, and he was ordered effervescent mixtures. Our next resort was to quicksilver, of which he took a large quantity, but the vomiting still continued. On Saturday morning Dr. Dymond saw him, about which time he had become much easier, and it was apprehended mortification had taken place; he died that night (on the 25th) about eleven o'clock. Application being made with success to open the body, we found the omentum was much drawn towards the stomach, and a portion of the small intestines appeared in a state of sphacelus, which on farther examination was found to be occasioned by its protrusion through the omentum, by which the intestine was strangulated. The intestines were completely evacuated of hardened feces, and in their natural state, except the strangulated portion. I also took out the quicksilver from above the stricture, not a particle having passed it.

Of the second cause of these strangulations I have been favoured with the following example from Mr. Hodson, a very excellent surgeon at Lewes, in Sussex.

Lewes, Feb. 13, 1807.

My dear Sir,

Case.

Agreeably to my promise I send you the case, which I mentioned to you when I was at your house.

A young man about twenty years of age had an attack of enteritis after going into the water to bathe while he was hot, in consequence of playing at cricket. The symptoms of enteritis were not violent, and soon gave way to the common remedies, and he appeared to be in a state of convalescence: under these circumstances he was attacked with vomiting soon after dinner, which he attributed to his having drank some porter with his dinner. The sickness continued in spite of every thing that could be done to relieve it, attended with a complete obstruction of the bowels, and he died in the course of a few days, under circumstances strikingly resembling those who die in consequence of incarcerated hernia. Upon examining the abdomen, it appeared that an adhesion had taken place between the omentum and peritoneum near Poupart's ligament, under which a portion of intestine had passed, and having become strangulated, it produced the obstruction in question.

I remain your very obedient Servant,

T. HODSON.

Case from Dr. Haighton.

Dr. Haighton also informed me that he was requested by Mr. Fearon, surgeon in the Adelphi, to inspect the intestines of a person who had died with all the symptoms of incarcerated intestine. The doctor found that the appendix cæci, which was longer than usual, had contracted an adhesion at its end to the surface of a portion of ileum which laid near it; and that it had formed a loop or doubling, into which a portion of intestine had passed, and become strangulated.

A membranous band forming the stricture.

With respect to membranous bands occasioning this strangulation, I have in my possession a most curious example, taken from the body of a patient of Mr. Weston's in Shoreditch. (See Plate 17). The case is as follows:

Case.

Richard Saxton, aged eighty-five years, who lived in Workhouse Lane, Hoxton, was seized on Feb. 14, 1805, with pain in his bowels, from which he had often suffered before, although he thought this somewhat different to his former attacks. As the pain continued to increase, Mr. Weston was sent for on the 15th, but he did not see him until the 16th, when he found him complaining of

great pain in the abdomen, and vomiting frequently. The abdomen was also distended; and upon feeling in the right groin, Mr. W. discovered a hernia, which he pressed upon, and after a short time reduced. Purgative medicine was then ordered, and an enema injected, but without any good effect, for the symptoms still continued, and he died a few hours afterwards.

I examined the body, and found that the intestine was returned, but with a membranous band embracing two of its convolutions, which were strangulated in the way which will be seen in the plate. The small intestines above the strangulated portion, which was ileum, were much inflated, and one portion of the strangulated part was very much discoloured. An irreducible omental hernia was found on the opposite side.*

For the following well drawn up case of obstruction from a membranous band, I am indebted to my friend, Mr. Dalrymple.

On the 26th of April, 1811, a gentleman in the 26th year of his age, very slender in his form, and of great delicacy of constitution, ^{Case.} was seized in the middle of the night, after an unusually hearty supper, with violent pains in the stomach and bowels, accompanied by nausea and cramp-like sensations in the calves of his legs. He was first visited about four hours after the commencement of the symptoms.

At this time he was vomiting largely his undigested supper of radishes; but the pains in his body and legs were so much abated, that he considered his complaint as an ordinary fit of indigestion, and apologized to his medical man for the early visit he had occasioned. In the course of the preceding hour the bowels had been twice purged. The pulse was small and quick, but soft. The tongue thinly covered by a whitish mucus; the temperature of the skin rather less than natural. The belly was in no part of it either hard or painful to the touch; but sensations of a very peculiar kind were referred to the region of the navel, and the countenance was marked by an expression of anxiety, which the degree at least in which the symptoms existed did not explain. Rigid abstinence from stimulants of every kind was enjoined; panada and thin broths were directed, and a solution of sulphate of magnesia in mint-water, with five drops of laudanum was ordered to be taken every three hours. At noon time he was better: the sickness had ceased; the pulse scarcely deviated from its natural condition; and in the evening another stool had much relieved the singular feelings at the umbilicus. A pill containing two grains of calomel, with half a grain of opium, was given at bed-time.

Twenty-first, nine o'clock, A. M. Slept about four hours during the earlier part of the night, and passed the remainder of it tranquilly. This morning he loathes food, but is free from pain. The pulse is 80, small and quick, the usual character of this gentleman's circulation; the tongue is slightly furred; the skin temperate and dewy. At two o'clock in the afternoon he is more unwell; he has frequent eructations with retchings, and vomiting occasionally the bland fluids he has taken mixed with bile; the pulse is 90. He says he has no positive pain, but complains of the same kind of sensations about the navel that have been already noticed, and his spirits are much cast down. There is neither tension nor tenderness of the belly, except at the umbilicus, around which part, to the extent of about a hand's breadth, a slight degree of pressure gives pain, and produces an immediate desire to vomit. The parietes of the abdomen are carefully examined; but they present not, either in the usual or more uncommon sects of hernia, any apparent tumour. He was let blood to the amount of fourteen oz., and eight leeches were applied upon the umbilical region; pills, with small doses of calomel and opium, and a solution of sulphate of magnesia, were given every two hours. Of appetite there is none; and for the thirst, which is troublesome, he uses barley-water and similar diluents. At nine in the evening he was easier; but he vomited more frequently, and had passed no stool. A clyster was injected, which returned in the space of two hours, mixed with a small quantity of feculent matter. The belly was fomented, and the same medicines were continued.

* The comparatively frequent occurrence of faecal obstruction from mechanical causes within the abdomen, and its usually fatal termination, confer an interest and importance on this department of our art, and have recently given rise to some excellent and useful remarks from the ingenious author of the paper on "Abdominal Surgery." The propriety of attempting, and the possibility of affording relief, under these circumstances by surgical operation, would be determined by the due consideration of the three following questions. First, Are the symptoms characterizing internal mechanical obstruction sufficiently marked to enable us to decide upon its existence? Secondly, Is the operation of opening the abdominal cavity generally followed by such effects as to deter us from the attempt? Thirdly, When the parts are laid open to our view, will their condition be such as to afford hope that a removal of the obstruction will be followed by a reparation of the mischief?

Although the progress and symptoms of the case may in most instances lead to a correct opinion as to the existence of mechanical obstruction, yet it is by no means so easy to ascertain the precise nature of the cause that gives rise to the obstruction; and hence the first difficulty that arises will be to distinguish between the different causes of intestinal derangement; for instance, intussusceptio; stricture of the larger bowels from disease of its coats; adhesions of the convolutions impeding peristaltic action; constriction from adventitious bands of adhesive matter; protrusion of a portion of bowel through an opening in the mesentery and mesocolon, attended with strangulation, etc. Now as faecal obstruction and consequent inflammation are the uniform effects produced by these various causes, and as the train of symptoms will, with few exceptions, be distinguished only by a slight shade of difference, the diagnosis will amount to little more than conjecture. An exception may be made in the case of children, who are more disposed to some of these causes than others; and also in the instance of chronic stricture of the large intestine, when the previous history may lead to a correct diagnosis.

There is unquestionably much less danger attending penetrating wounds of the abdominal parietes than was formerly supposed; as is evinced by the operations that are performed for herniæ and other complaints, and the instances of recovery after severe wounds of the abdomen recorded in civil and military works of our own day. This may be partly owing to the successful attempt at union by the adhesive process; but even a complete closure of the external opening by adhesion will not always prevent the occurrence of inflammation, and of that general collapse which attends abdominal inflammation even in its early stage. The system takes but little cognizance of small wounds; but extensive incisions, whether in operations or from accident, even under the most favourable circumstances or under the most judicious hand, are too often followed by a different result; and every practical surgeon of extensive experience will, I apprehend, concur with me in considering a successful operation of removing large ovarian tumours, or of opening very large herniæ, as fortunate but rare exceptions. To this opinion are opposed experiments made on brutes, in whom severe injuries may be inflicted on the abdominal cavity with impunity; the inference, however, when applied to man, is in my view illogical: analogy may satisfactorily illustrate on the lower class of animals a principle of physiology or pathology, but can never determine the degree of susceptibility possessed by human textures, nor the extent of injury which they can sustain: this can only be ascertained by the course of experience.

The possibility of affording relief when the abdomen is laid open, and the obstructing course exposed, may in many instances be decided in the affirmative; thus constricting bands may be removed, involved portions of gut may be released, an adherent convolution be detached, or a gut distended above the seat of stricture be relieved: but it is to be borne in mind that gastrotomy will be had recourse to only as a dernier resort, when other remedies have failed, and the symptoms have assumed an aspect promising but little chance of success. At this advanced period peritonitis will have supervened, adhesion may have inseparably bound it to the surrounding parts, or gangrene may have prevented all chance of repair; and thus, though the cause of obstruction be removed, the effects in the majority of cases will continue, and lead to a fatal termination.—ED.

Twenty-second, eight o'clock, A. M. After a sleepless but not unquiet night, appearances are much as yesterday evening. The vomiting continues, and there has been no stool; the pulse is near 100, small and weak; the uneasiness at the navel somewhat abated, and the same degree of pressure upon this part, which yesterday gave pain, is this morning scarcely perceived. Upon every other part of the abdomen moderate pressure produces no sensations: the tongue, however, is more thickly furred, and the skin is hotter. There is great thirst with frequent eructations, and an affecting expression of anxiety in the face. The clyster was repeated; the fomentations were continued; and effervescing draughts with small doses of laudanum ordered to be taken every two hours. At four o'clock, P. M. the constipation continues; the clyster returning unaltered, after having been retained about two hours. The vomiting is now frequent; the thirst more urgent; leeches again applied; the clyster repeated; the fomentations and internal remedies continued.

Twenty-third, eight o'clock, A. M. A very restless night has been passed; the vomiting is almost incessant; and there has been no discharge from the bowels. The pain at the navel is much as yesterday afternoon; the thirst very urgent; the pulse 120 and weak. At noon it was determined in consultation to take twelve oz. of blood from the arm, and to apply a large blistering plaster to the abdomen; the medicines of yesterday, with the general treatment adopted at the commencement of the illness, were continued. At ten o'clock in the evening the symptoms are unabated; the bowels are immovable; and the patient is evidently weaker than in the morning. There is scarcely any pain, neither is there soreness nor hardness of the belly. The blood drawn at noon-time exhibits none of the signs of increased arterial action.

Twenty-fourth, six o'clock, A. M. Has passed a dreadful night; there is, indeed no pain, but the vomiting is incessant, every thing being rejected with a convulsive effort the instant it reaches the stomach; the constipation is complete; the thirst insatiable; the tongue has lost the greater part of its cuticular covering, and is become exquisitely sore. The pulse is too rapid to be counted; and a tormenting hiccough is superadded to the other miseries of a patient, the powers of whose constitution at all times weakly and ill calculated to sustain a shock like this, now seem to be nearly exhausted: yet, amidst all these causes of anguish and irritation, the intellect remains unclouded, the habitual serenity of the temper is unbroken; the anxious character of the countenance has settled into a soft and tranquil air of melancholy, giving to a physiognomy naturally very interesting an expression that is perfectly affecting. At ten in the forenoon the vomiting became distinctly feculent: in three or four hours more the exhaustion of the vital powers seem almost complete. The pulse is scarcely to be felt; the extremities are losing their heat, and the skin is universally covered by a cold and clammy sweat. Later in the evening the vomiting and hiccough ceased; and at three o'clock in the morning of the 25th the unfortunate subject of this observation died.

Dissection.

The body was opened thirty hours after death. On exposing the cavity of the abdomen, which was in no degree tumid, the peritoneum of the parietes was attentively examined; but it retained its natural hue and lustre, and did not appear to have undergone any change. The stomach was healthy, and contained a small quantity of air and fluid matter. The small intestines were entirely concealed by the omentum, which, loaded with blood, was spread out into a broad sheet and tied down by innumerable bands to the whole of the anterior half of the brim of the pelvis, from the iliac extremity of the branch of the os pubis of one side to the same part of the same bone of the other side. These adhesions, indeed, were continuous along the whole extent of the lower edge of the omentum; and seemed, by their colour and the firmness of their texture, to have been of long standing. On dividing the omentum the small intestines were exposed to view, lying nearly in their usual position, and presenting neither upon their peritoneal coat nor in the interspaces of their convolutions any of the usual results of inflammation. This observation, however, is only applicable to the duodenum and jejunum, and to the upper portions of the ileon; for, proceeding to trace the remainder of the canal, a mass of bowel, greatly distended with some fluid matters and in a state of inflammation, was perceived lying nearly in the centre of the umbilical region, and in the situation to which the peculiar sensations of the patient were referred. This proved to be a portion of ileon in a state of strangulation, occasioned by a membranous band, which attached at one of its extremities to a portion of the mesentery appertaining to the ileon, first advanced in front of and directly across that bowel, then suddenly turning round in close contact with it, proceeded backwards and a little upwards towards the left hypochondrium, whence, appearing again in front and crossing another piece of the gut, extended obliquely downwards towards the right hip, and was firmly attached along with a process of omentum, to which it was for some little extent adherent, to the inner edge of the margin of the pelvis at the point of union of the os pubis with the os ilium. This band varies in thickness in the course of its progress around the intestine, but it is uniformly dense and firm in its texture; and although it no where adheres to the bowel, (for when this was emptied of its contents it might easily be withdrawn from the strangulating chord), yet by the course which it takes and the manner in which it embraces the canal, it has produced a curious variety of that species of hernia which the greatest of living writers on that most interesting subject has denominated "hernia within the cavity of the abdomen." No other diseased appearances were observed. No other cavity was inspected.

A similar train of symptoms to those above related, but more chronic in their progress, occurred in a patient who was admitted into Guy's Hospital. The dissection was made by Mr. King, of Mortlake, to whom I am obliged for the following account.

Case.

About six hours after his death I inspected his body, assisted by Mr. Davies, when the following appearances presented themselves. At the ring on the left side was a hernial sac, which readily admitted the fore-finger, but it did not contain either intestine or omentum. There was no appearance of hernia having ever existed on the right side, either at the ring or under the crural arch. On directing our attention to the epigastric region, the upper surface of the liver appeared perfectly sound and healthy; but the under surface exhibited strong marks of inflammation, and adhered strongly to the whole length of the gall-bladder, which was distended to a very considerable size by dark coloured bile. The entrance of the duct into the duodenum was closed by coagulable lymph, and this intestine was much inflamed and distended with air. The stomach was large and flaccid, and did not shew much appearance of inflammation, except along its lesser curvature; it contained scarcely any thing but air. In tracing the course of intestines we observed some light coloured and rather firm faeces lying within the cavity of the right os ilium, which led us to examine this part more fully, which proved to be the seat of the disease. A portion of the intestinum ileum had contracted a very firm adhesion, for about an inch and a half in length, to the side of the pelvis, a little behind and below the anterior superior spine of the ilium. A membranous band was likewise stretched over the

intestine so as to bind it down very firmly, and in such a way as must have occasioned a considerable diminution of its canal. Immediately above these adhesions the size of the intestine was much increased, but in an irregular way, so as to form several pouches, the largest of which, about the size of a hen's egg, was situated immediately over the stricture, and they gradually diminished in size till the intestine recovered its natural diameter, which might be about six inches above the stricture or adhesion. The intestine and its pouches were completely filled with clay-coloured fæces of the consistence of putty, except immediately over the adhesion, where the part had given way and some of the contents had escaped as before mentioned. From the discoloured appearance at the edge of the ruptured intestine, I should be inclined to think that it had given way before the body was opened; but the size of the opening was so much increased by our pulling the intestines, etc., forward, before we had ascertained the seat of the disease, that it is impossible to say what was the exact state of the parts at the time of death. Had not the parts been so much lacerated, I should have been glad to have sent them to you, but trust the description which I have given you will convey to you an idea of the case. Immediately below the adhesion the intestine was extremely small, quite empty, and scarcely at all discoloured. At the adhesion, and immediately above it, were marks of discolouration, but not to such an extent as I should have expected. The large intestines contained nothing but wind, and shewed more or less of inflammation during their whole course. It was evident that nothing had passed beyond that part of the ileum which adhered to the pelvis; but whether that adhesion was of long standing, or had been formed during this last illness, you will be best able to judge; but from the pouch-like enlargement of the gut immediately above it, I am rather inclined to adopt the former opinion.

In plate xvii. a portion of intestine will be seen, which was given me by my friend Mr. Headington, Surgeon of the London Hospital, who favoured me with the following account of it.

Dear Sir,

Our case-book having by some accident been misplaced, has prevented me from sending you the history of the preparation in your possession. I have only to regret that such a circumstance should have occasioned such an apparent remissness on my part.

Communication
from Dr. Heading-
ton.

Believe me sincerely your's,

R. C. HEADINGTON.

A. B., about fifty years of age, died in the London Hospital of general dropsy, under the care of Dr. Frampton, and was examined at his request. Independently of a diseased state of the liver, and of a considerable quantity of fluid in the cavities of the thorax and abdomen, there was found a hernial sac through each of the abdominal rings, the one on the right side being of considerable extent; and a hernial sac under the left Poupart's ligament. In the course of the ileum an adhesion had taken place between many of the convolutions of that intestine, and which adherent portion had no doubt formed at one time the contents of a hernia. Above where this adhesion had taken place, along the greater part of the jejunum, a number of pouches were formed, varying from the size of a pea to that of a walnut, chiefly situated between the layers of the mesentery. These pouches appear to have been the consequence of an obstruction in the alimentary canal, produced by the descent of the intestine, as they were all seated above the adherent portion we have mentioned. The intestine we may suppose had given way at that part where it was least supported. It appears likewise most probable, that the sacculi consist of the internal coat of the intestine only, resembling those pouches which are sometimes formed by a protrusion of the internal coat of the bladder between its muscular fibres. The sacculi were completely distended with flatus at the time of the removal of the jejunum, nor did they appear to contain any of the grosser contents of the intestine.

Adhesions contracted by portions of intestine are sometimes productive of complete obstruction to the passage of the fæces; and in a preparation sent me by Dr. Marshall Hall, a portion of gut had become strangulated by two portions so adhering.

The patient, a female, had been previously subject to attacks of inflammation of the bowels. The symptoms during her last illness were those of obstruction; and as no external hernia could be discovered it was considered as probably intussusceptio. Case.

On examination after death it was found that different parts of the intestines had contracted adhesions. In one part two folds of intestines had adhered in one point only, (as may be represented by bringing the points of the thumb and finger in contact). Through the noose thus formed another fold of intestine was passed, and had become strangulated *

* In the year 1819 I examined the body of a patient, who died in Guy's Hospital with the usual protracted symptoms of intestinal obstruction. A band of adhesive matter was found encircling a portion of ileum, commencing from the convex surface of a jejunal convolution, and passing around the constricted portion to the under surface of the mesentery to which it was attached. We have in our museum a preparation of a similar effect, arising from the appendix cæci, the apex of which had contracted adhesion and enclosed a convolution of the ileum.—ED.

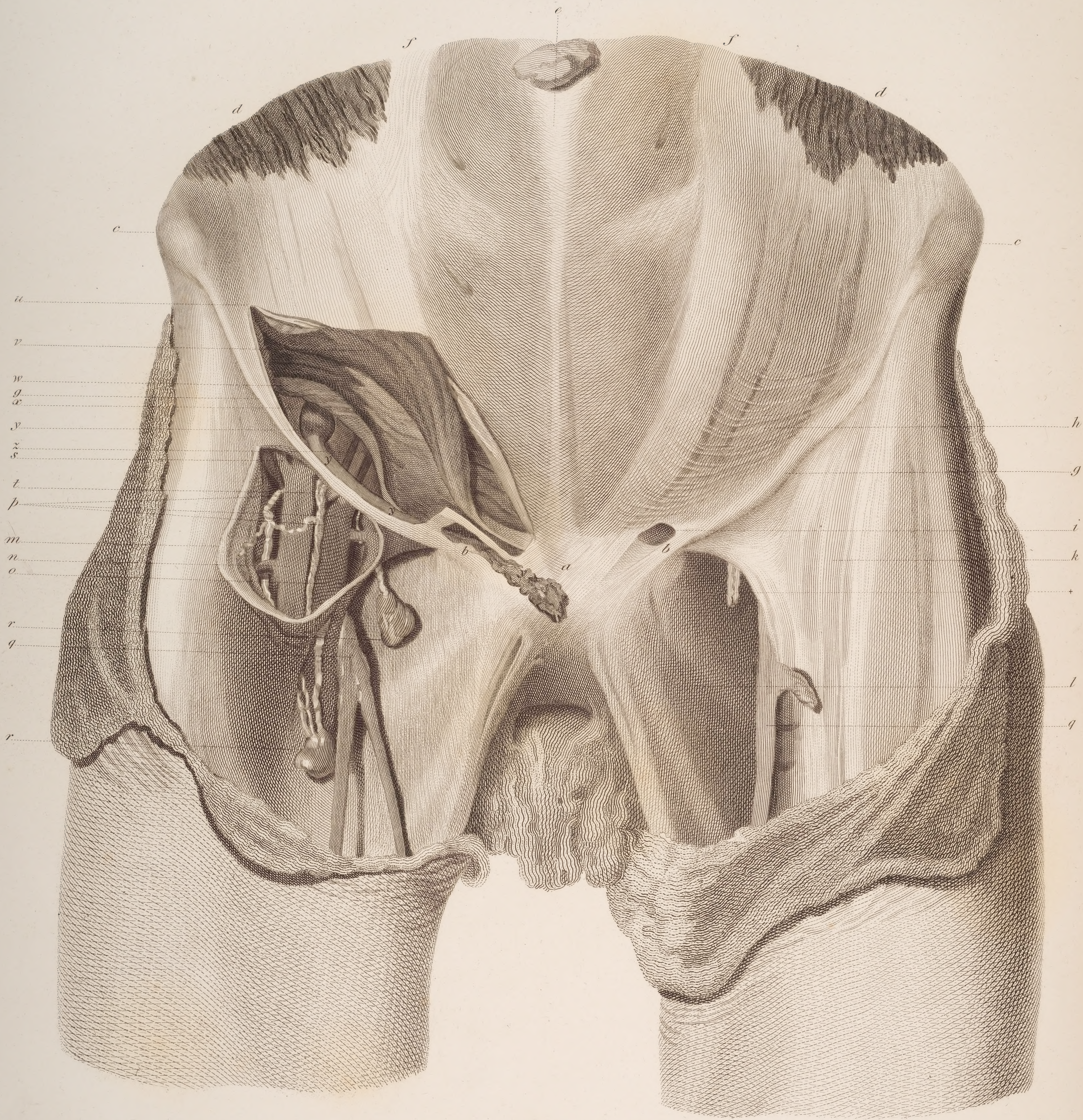


PLATE I.

THIS plate is intended to exhibit a view of the abdominal rings, and of the crural arch in the female; the fascia lata of the thigh, the crural sheath, and the passage of the round ligament of the uterus, from the internal to the external ring.

- a.* Symphysis pubis.
- b.* Tuberosity of the pubes.
- c.* Anterior superior spinous process of the ilium.*
- dd.* External oblique muscles.
- e.* Linea alba.
- f.* Linea semilunaris.
- g.* Crural arch, or Poupart's ligament, extending from the spinous process of the ilium at *c*, beyond the tuberosity of the pubes at *b*.
- h.* Tendinous fibres crossing the columns of tendon, of the external oblique: they proceed from the spinous process of the ilium, and the crural arch.
- i.* The abdominal ring on the left side; its upper column inserted into the symphysis pubis, and the lower into the tuberosity, but afterwards extended forwards towards the symphysis.
- k.* That part of the fascia lata of the thigh, which proceeds from the crural arch, and which covers the muscles on the outer part of the thigh, and femoral vessels.
- l.* The inner portion of the fascia lata covering the pectineus and triceps muscles, and united with the outer portion of fascia behind the saphena major vein.
- m.* Crural sheath cut open.
- n.* Femoral artery.

- o.* Femoral vein.
- p.* Three absorbent vessels within the sheath, the first on the outer side of the artery, the second between the artery and vein, and the third on the inner side the vein, which last has the course of the crural hernia.
- qq.* Saphena major vein.
- rr.* Two absorbent glands sending forth the absorbent vessels of the sheath.
- s.* Arteria circumflexa ilii.
- t.* Epigastric artery.
- u.* Tendon of the external oblique muscle laid open.
- v.* Internal oblique muscle turned upwards.
- w.* Transversalis muscle turned upwards.
- x.* Fascia transversalis seen passing from the crural arch behind the transversalis muscle.
- yyyy.* Round ligament of the uterus descending through the opening in the fascia, in the inguinal canal, and through the abdominal ring, to be lost in the fat on the pubis.
- z.* Course of the epigastric artery seen through the fascia transversalis.
- † Absorbent vessels on the left side entering the crural sheath, at the part at which the crural hernia passes into the thigh.

* I shall hereafter call this simply the spinous process of the ilium.

PLATE II.

CONTAINS views of the anatomy of the groin and upper part of the thigh in the female.

FIG. 1.

- a. Symphysis pubis.
- b. Spinous process of the ilium.
- c. Abdominal muscles.
- d. Abdominal ring.
- e. Crural arch.
- fff. Fascia lata of the thigh.
- gg. Semilunar edge of the fascia lata.
- h. Crural sheath or fascia enclosing the crural vessels.
- i. Saphæna major vein.
- k. Place at which the crural hernia descends.

FIG. 2. Shews the insertions of the external oblique muscle into the pubes and its ligament, and the fascia iliaca, or Gimbernat's fascia.

- a. Pubes.
- b. Spine of the ilium.
- c. Acetabulum.
- d. Thyroid foramen.
- e. Column of tendon. f. Another column. g. A third column, making together two apertures at the abdominal ring in the female, which is not uncommon.
- h. Anterior edge of the crural arch, or Poupart's ligament.
- i. Third insertion of the external oblique muscle.
- k. Ligament of the pubes, into which the external oblique i is inserted.
- l. Portion of fascia transversalis, and tendon of the rectus, passing behind the insertion of the external oblique.
- m. Fascia iliaca passing from the crural arch over the iliacus internus muscle.
- n. Orifice of the crural sheath, for the passage of the crural artery vein and absorbent vessels.

FIG. 3. Shews the crural sheath.

- a. Pubes.
- b. Ilium.
- c. Abdominal muscles drawn up.
- d. Transversalis muscle.
- e. Its tendon.
- f. Seat of the posterior edge of the crural arch.
- gg. Fascia transversalis.
- h. Inner portion of the same fascia.
- i. Fascia iliaca.
- k. Femoral sheath.
- l. Femoral artery.
- m. Femoral vein.
- n. Saphæna major vein.
- o. Anterior crural nerve.
- p. Fascia lata turned back.
- q. Tendon of the external oblique muscle, drawn down.

FIG. 4. Posterior view of the place at which the crural hernia descends, as it appears when the peritoneum is first stripped off.

- a. Pubes.
- b. Abdominal muscles.
- c. Round ligament passing into the inner abdominal ring.
- d. Femoral artery.
- e. Femoral vein.
- f. Epigastric artery.
- g. Epigastric vein.
- h. Depression at which the crural hernia first descends.

FIG. 5. Posterior view, shewing the mode in which the abdomen is shut from the thigh. The peritoneum is removed.

- a. Pubes.
- b. Ilium.
- c. Abdominal muscles.
- d. Rectus.
- ff. Junction of the fascia iliaca and transversalis behind the crural arch.
- g. Round ligament passing from the abdomen through the fascia transversalis.
- h. A portion of fascia or tendon passing from the pubes to join the rectus.
- i. Fascia iliaca.
- k. Iliac artery.

- l. Iliac vein.
- m. Epigastric artery.
- n. Epigastric vein.
- o. Anterior crural nerve.
- p. Crural space, by which the crural hernia descends: it leads into the crural sheath.

FIG. 6. A similar view, but with a portion of the fascia transversalis raised.

- a. Pubes.
- b. Ilium.
- c. Iliacus internus.
- d. Psoas.
- e. Fascia iliaca.
- f. Rectus abdominis.
- g. Junction of the fascia iliaca and transversalis at the edge of the crural arch.
- h. Fascia transversalis.
- i. Ligamentum rotundum, passing from the abdomen through the fascia transversalis.
- k. Fascia transversalis, and portion of the tendon of the rectus raised.
- l. Inferior column of the tendon of the external oblique.
- m. The abdominal ring.
- n. The third insertion of the external oblique.
- o. Iliac artery.
- p. Iliac vein.
- q. Epigastric artery.
- r. Epigastric vein.
- s. Circumflexa ilii.
- t. Absorbent gland receiving the different crural absorbent vessels.
- v. Absorbent vessels passing through the crural space or ring which is seen situated between the third or semicircular insertion of the external oblique muscle.
- w. A part of the posterior edge of the crural arch which forms one of the seats of stricture in large crural hernia.

FIG. 5 and 6 were both drawn removed from the body as they appear in the plate, which accounts for the flatness of their appearance.

FIG. 7. Crural hernial sac removed to shew the opening by which it descends in the female.

- a. Seat of the pubes.
- b. Crural arch extending towards the ilium.
- cc. Abdominal muscles.
- d. Crural arch.
- ee. Fascia lata.
- f. Semilunar edge of the fascia lata.
- g. Third insertion of the external oblique.
- h. Femoral artery.
- i. Femoral vein.
- k. Femoral sheath.
- l. Abdominal ring.
- m. The orifice by which the crural hernia descends formed on the outer side by the crural sheath, on the inner by the semicircular insertion of the tendon of the external oblique, and above in part by the crural sheath and in part by the semilunar edge of the fascia lata. The division in crural hernia is made at the upper and inner part.

FIG. 8. Posterior view of the same preparation.

- a. Seat of the pubes.
- b. Abdominal muscles.
- c. Iliac vein.
- d. Epigastric artery.
- e. Epigastric vein.
- f. Peritoneum.
- g. Hernial sac drawn from the aperture.
- h. A fascia cut off which covers it.
- i. Third insertion of the external oblique muscle.
- k. Fascia on the inner side of the vein.
- l. Aperture by which the crural hernia descends.
- m. A line from this points out the posterior edge of the crural arch, which assists in forming the stricture of crural hernia.

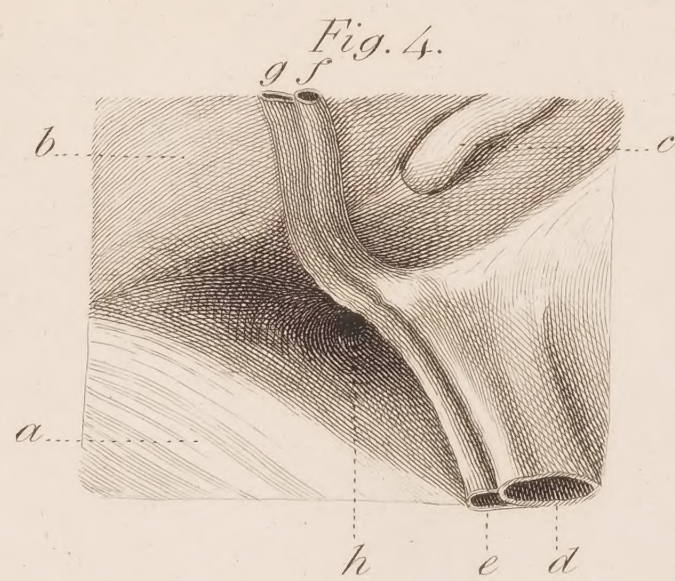
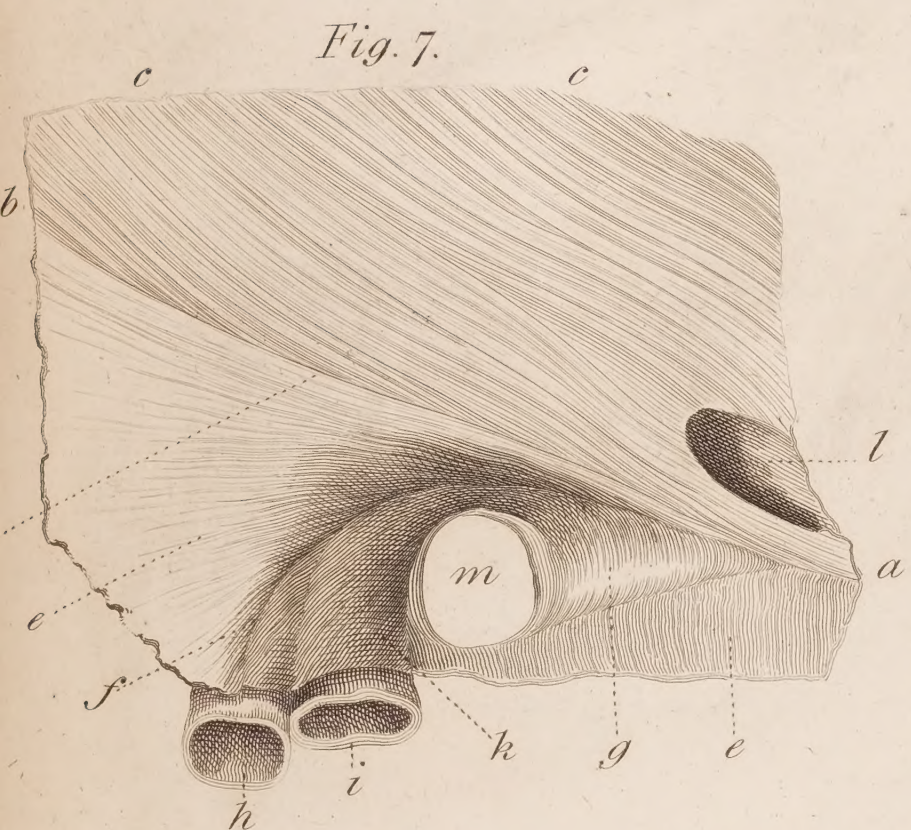
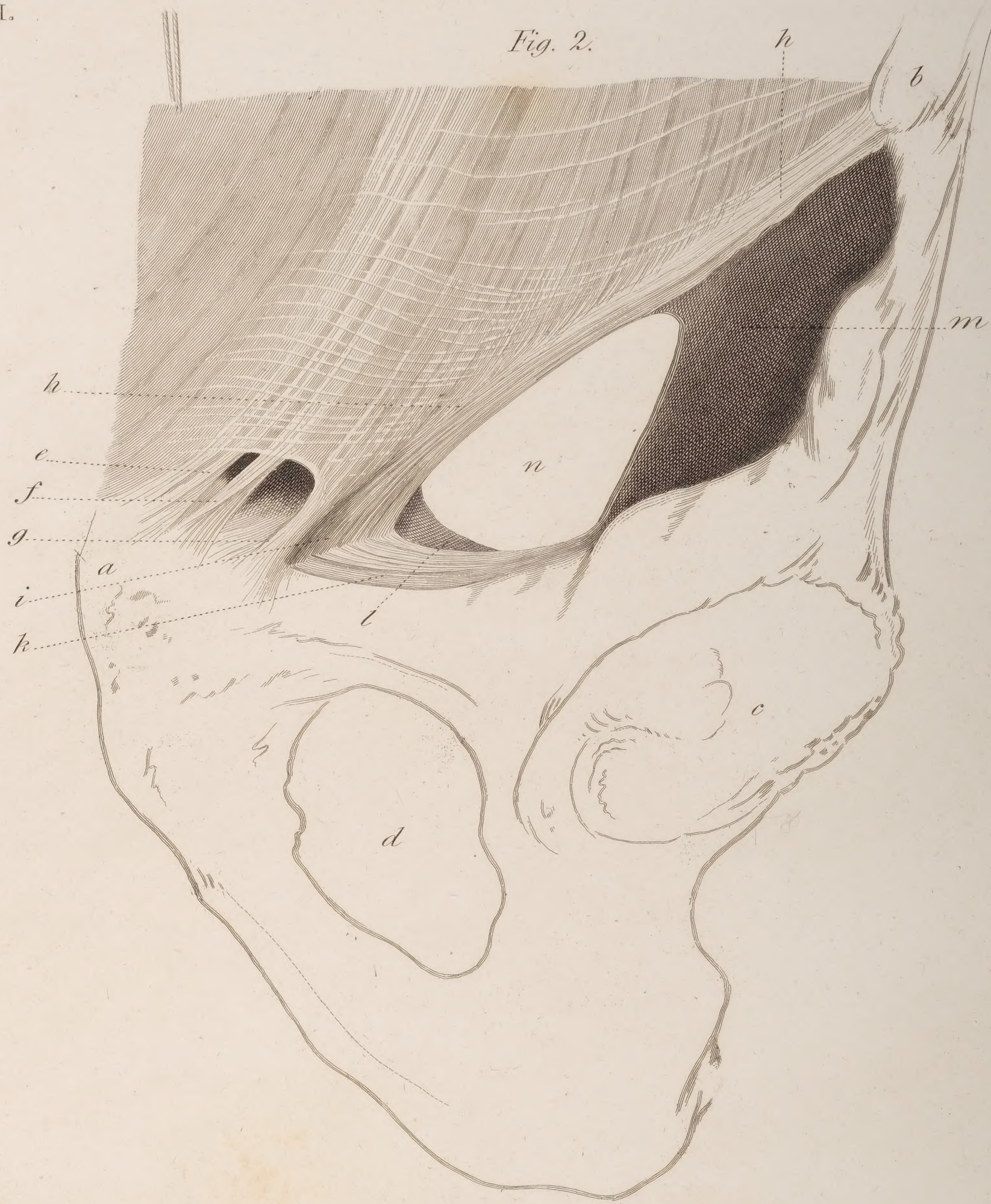


Fig. 1.

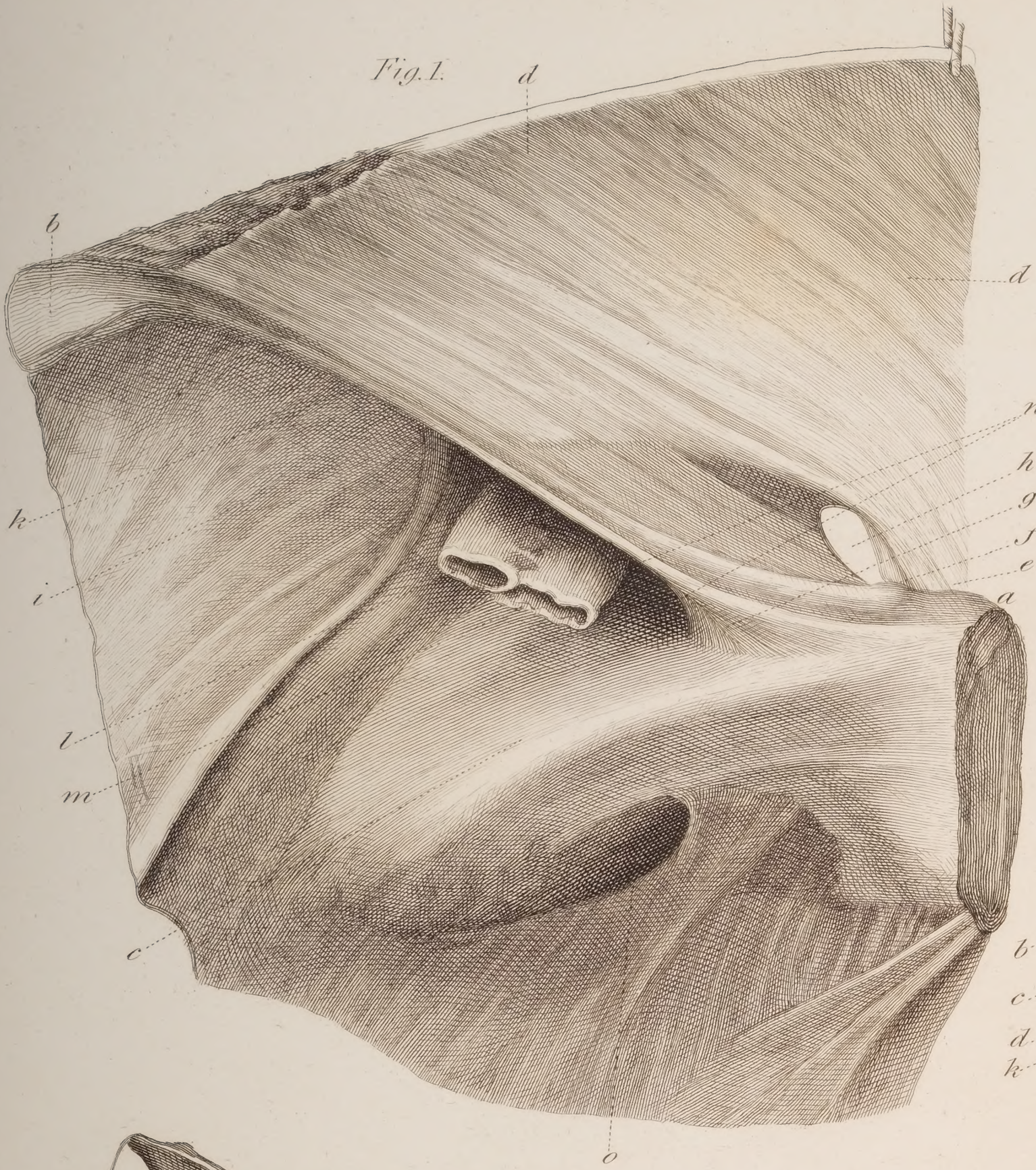


Fig. 8.

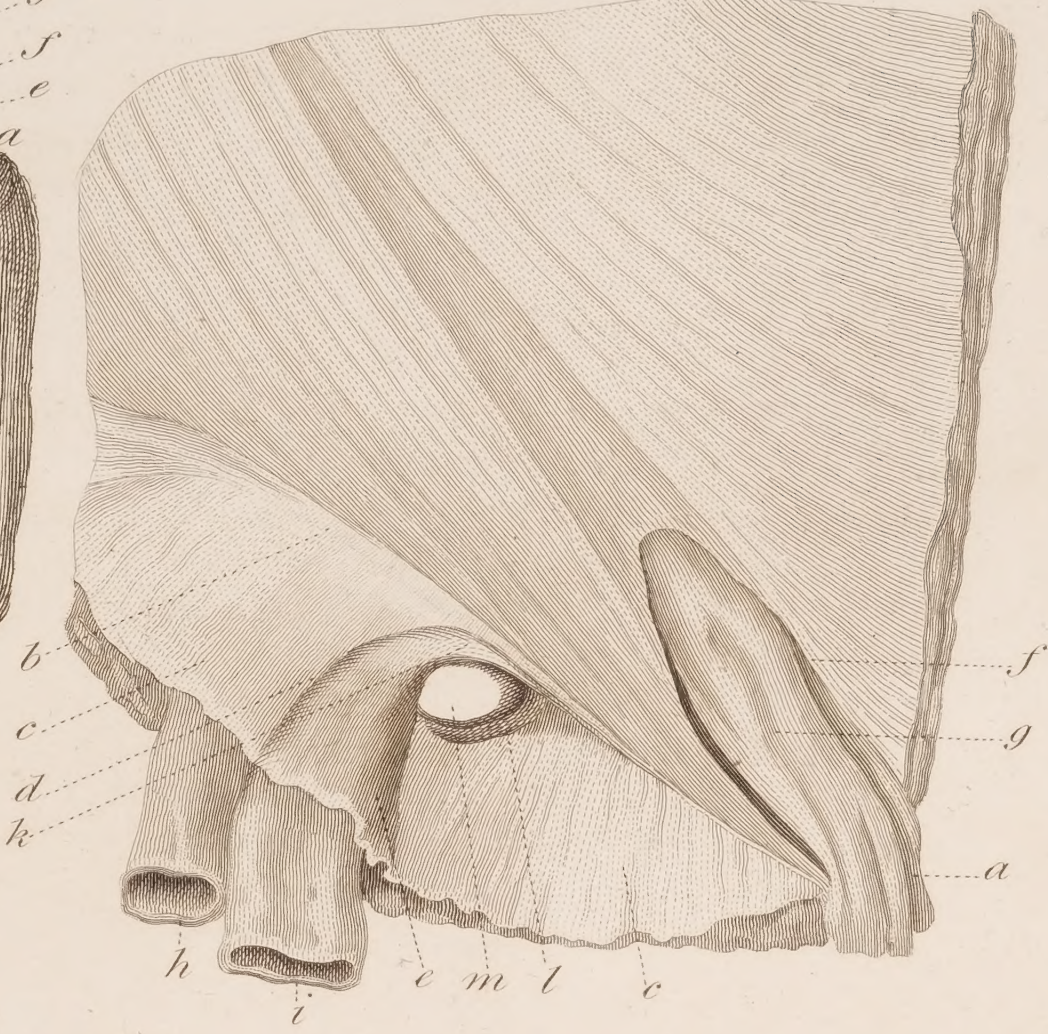


Fig. 4.

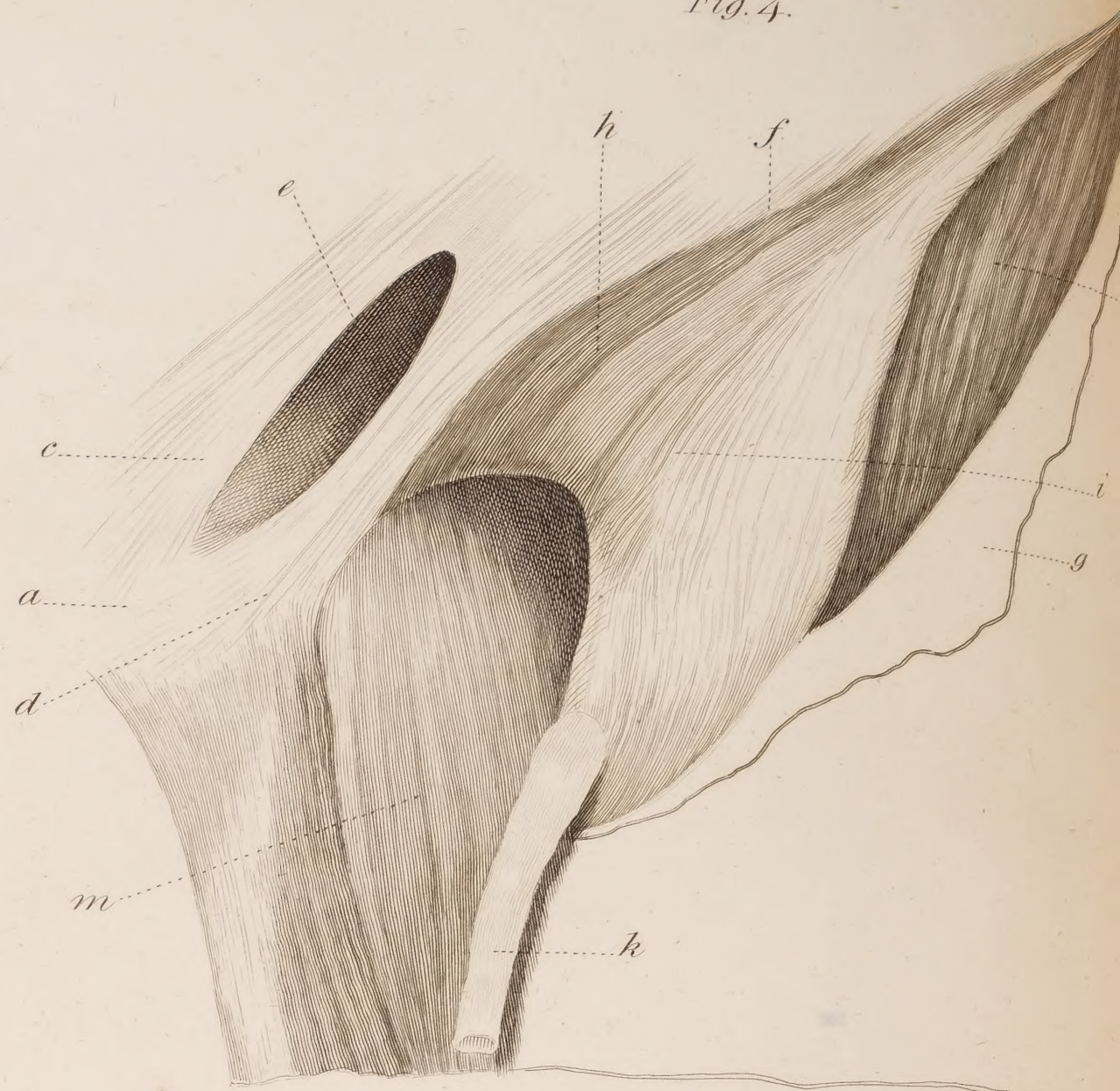


Fig. 5.

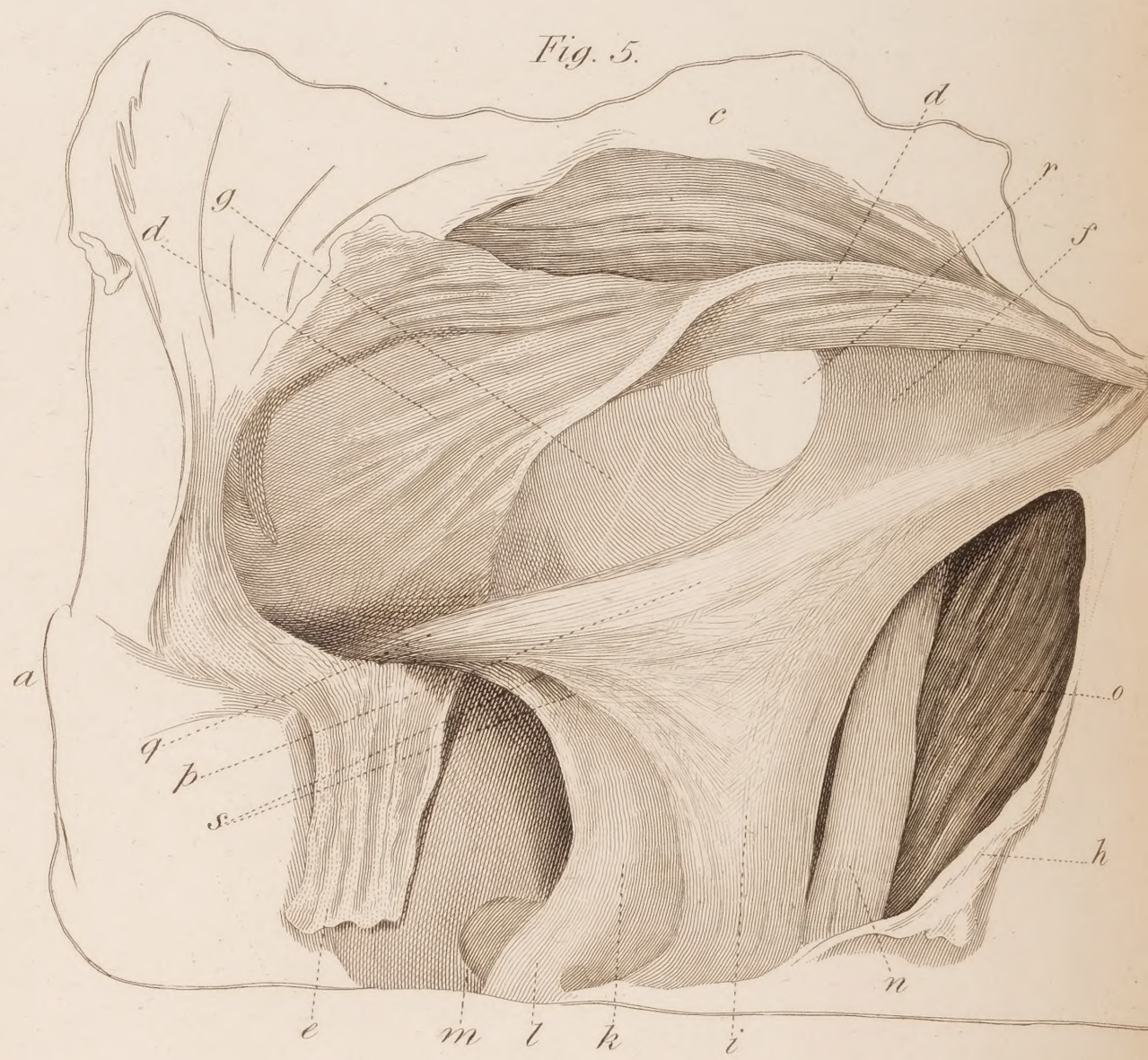


Fig. 6.

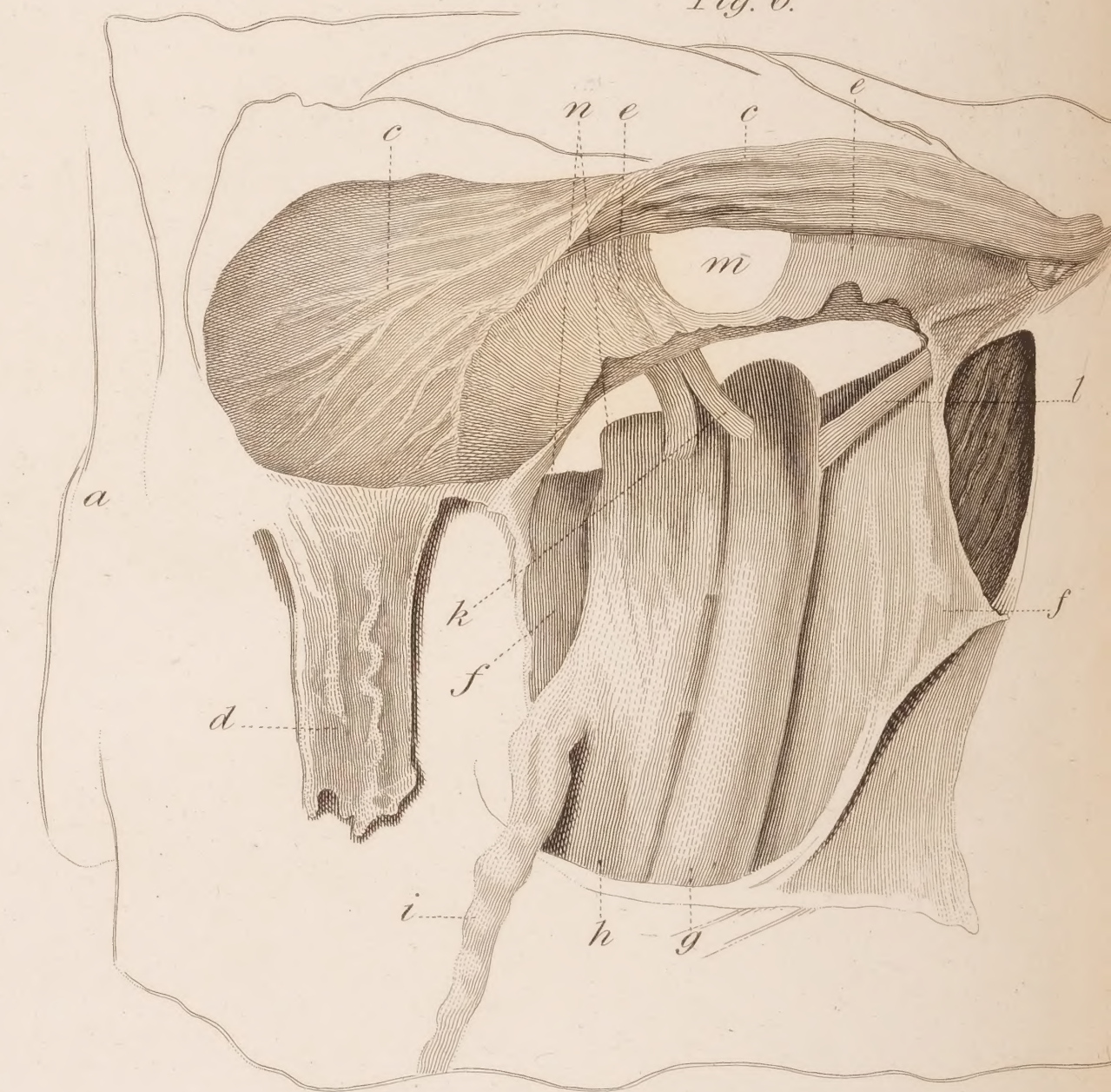


Fig. 9.

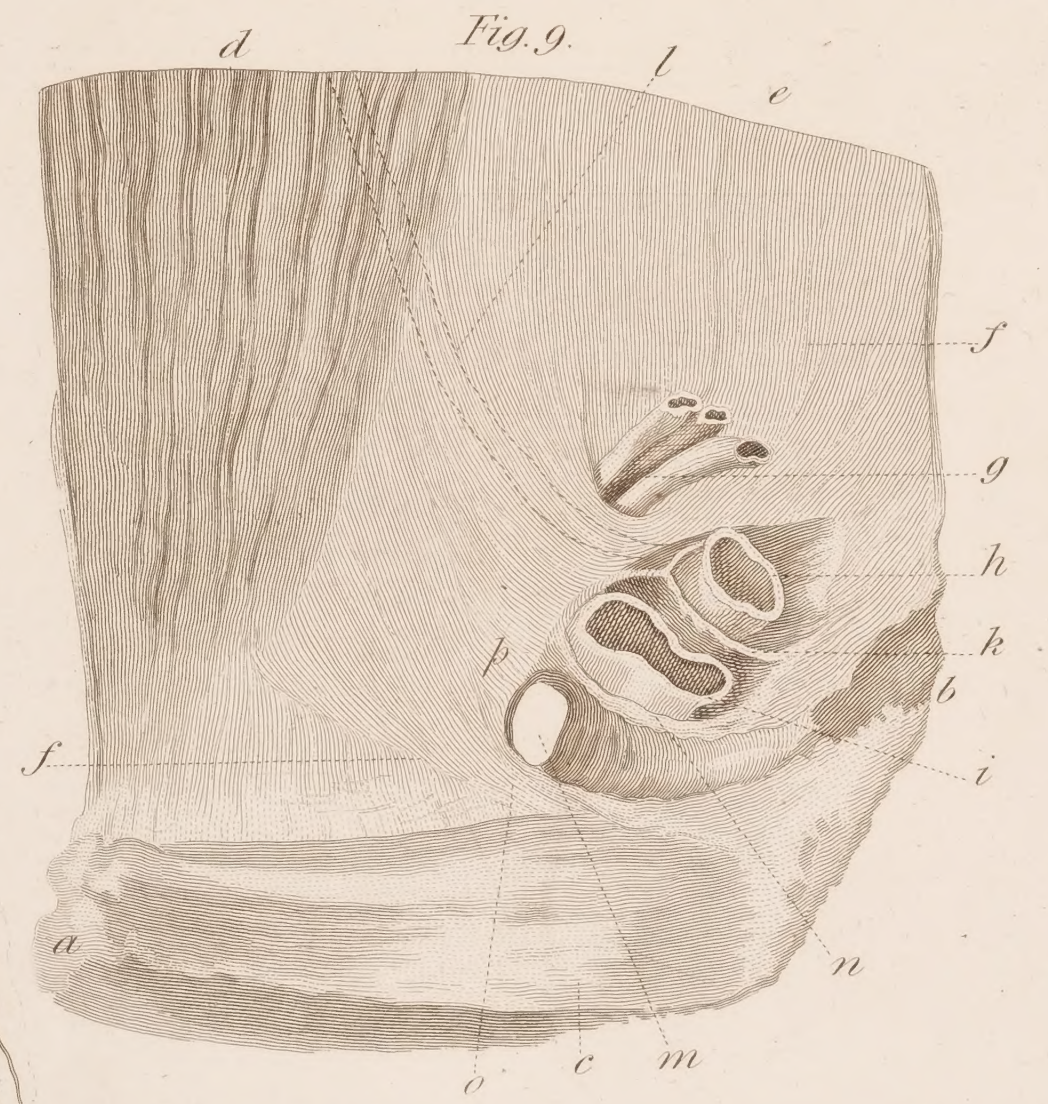


Fig. 3.

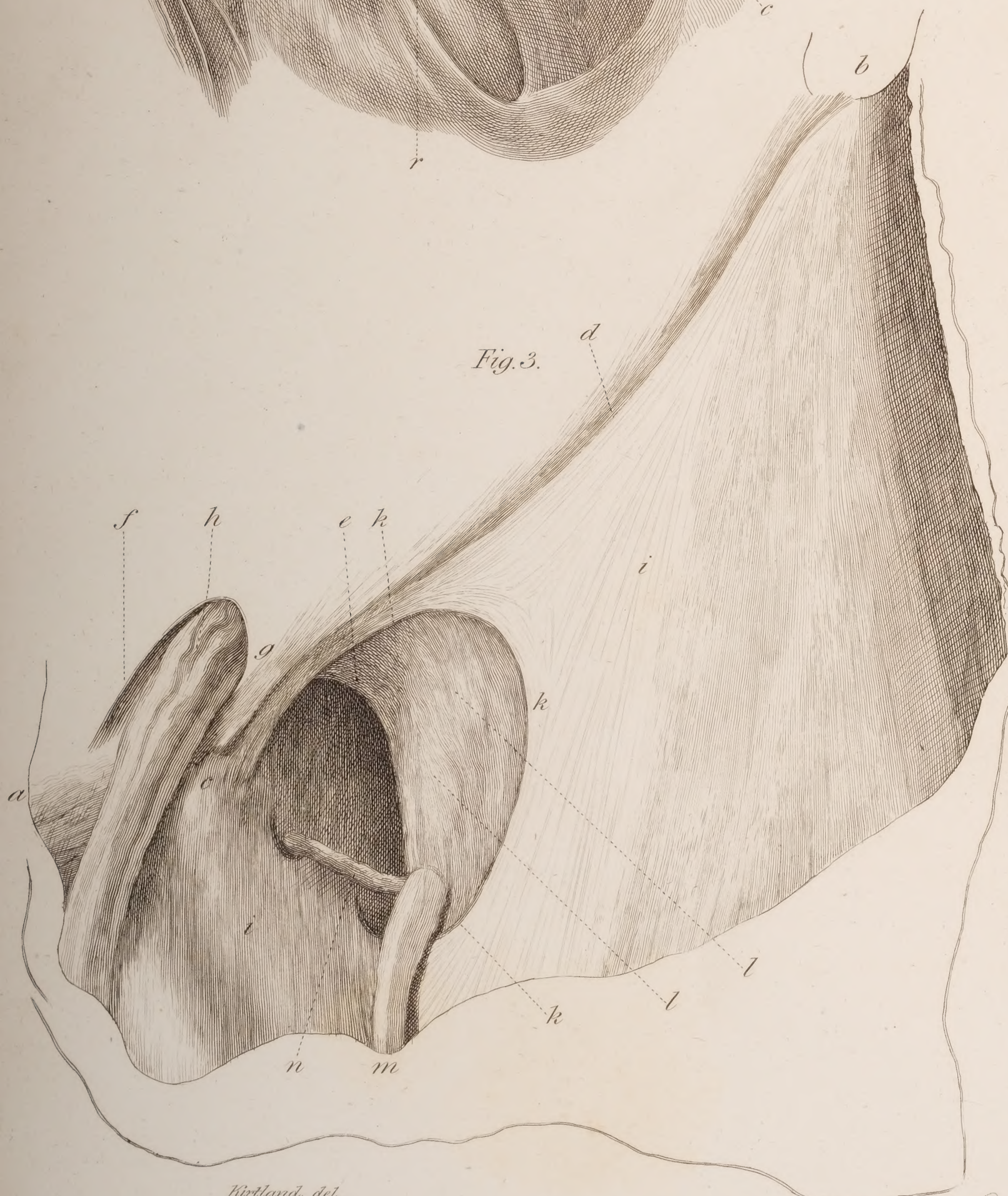


Fig. 7.

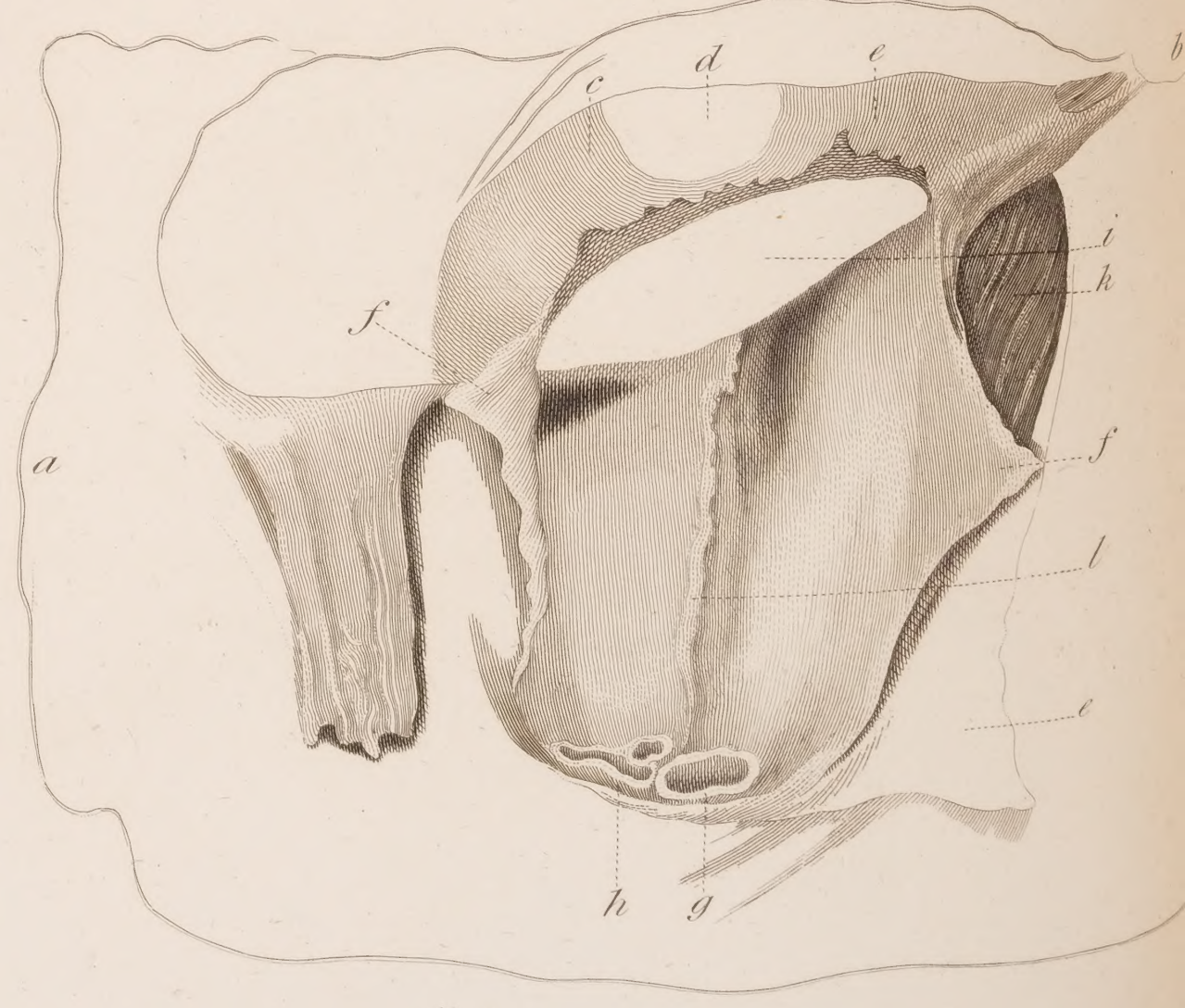


PLATE III.

VIEWS of the parts in the groin of the male, intended to shew their anatomy.

FIG. 1. Posterior view of the external oblique muscle, of the external iliac artery and vein, and of the fascia iliaca.

- a. Symphysis pubis.
 - b. Spinous process of the ilium.
 - c. Linea ileo-pectinea of the pubes.
 - d. External oblique muscle and its tendon.
 - e. Superior column of the tendon of the abdominal ring.
 - f. Insertion of the inferior column of the ring into the tubercle of the pubes.
 - g. The third insertion of the external oblique into the ligament of the pubis, from whence it is extended towards the symphysis.
 - h. Abdominal ring.
 - i. The fascia iliaca extending over the iliacus internus and psoas muscles.
 - k. The junction of the fascia iliaca with the posterior edge of the crural arch, and it is seen extending near to the external iliac artery.
 - l. External iliac artery.
 - m. External iliac vein.
- [These vessels pass through an oval space, which is the beginning of the crural sheath, and bounded internally by the third insertion of the external oblique muscle, externally by the fascia iliaca joining to the posterior edge of the crural arch, behind by the process of the same fascia, and before by the posterior edge of the crural arch.]
- n. Posterior edge of the crural arch extending from the pubes to the ilium. That part of it which is included between the two lines from *n*, forms the posterior stricture in large crural herniæ.
 - o. Thyroideal foramen.

FIG. 2. A posterior view of the parts of the groin when the peritoneum is removed.

- a. Symphysis pubis.
- b. The seat of the spine of the ilium.
- c. Junction of the pubes and ilium.
- ddd. Abdominal muscles.
- e. Iliacus internus muscle covered by the fascia iliaca.
- f. Psoas muscle covered by a portion of the same fascia.
- ggg. Fascia transversalis lining the abdominal muscles, and descending to the crural arch.
- h. Poupart's ligament, or the crural arch, where the two fasciæ join.
- i. A process of fascia passing upon the iliac artery and vein, uniting them to the edge of the crural sheath.
- k. Internal abdominal ring, or upper aperture of the inguinal canal.
- l. Spermatic cord passing through that aperture.
- m. External iliac artery.
- n. External iliac vein.
- o. Epigastric artery and vein.
- p. Third insertion of the external oblique into the pubes, covered, however, by the fascia transversalis.
- q. The space by which the crural hernia descends, the finger having passed into it before the drawing was made to push down the fascia which extends over it.
- r. The thyroideal foramen.

FIG. 3. An anterior view of the groin.

- a. Symphysis pubis.
- b. Spine of the ilium.
- c. Tuberosity of the pubes.
- d. Crural arch, or Poupart's ligament.
- e. The place at which the crural hernia descends.
- f. Superior column of the abdominal ring.
- g. Inferior column.
- h. Abdominal ring.
- ii. Fascia lata.
- kk. Semilunar edge of the fascia lata, somewhat larger in this subject than usual.*
- ll. Crural sheath covering the femoral artery and vein, at the inner and upper part of which at *e* the crural hernia descends.
- m. Saphæna major vein entering the sheath.
- n. A vein entering the saphæna major.

FIG. 4. Is intended to shew the crural sheath, and the insertions of the external oblique muscle.

- a. Pubes.
- b. Ilium.
- c. Superior column of the abdominal ring.
- d. Inferior column.
- e. Abdominal ring.
- f. Anterior edge of the crural arch, or Poupart's ligament.
- g. Fascia lata dissected from the crural arch and turned back.
- h. Third insertion of the external oblique into the ligament of the pubes; to see which the fascia lata and the origin of the pectineus muscle must be raised.

- i. Crural or femoral sheath covering the crural artery and vein.
- k. Saphæna major vein entering the sheath.
- l. Iliacus internus muscle.
- m. Pectineus muscle.

FIG. 5. Shews the connection of the crural sheath with the fascia transversalis.

- a. Pubes.
- b. Ilium.
- c. Abdominal muscles.
- dd. Transversalis muscle and tendon.
- e. Tendon of the external oblique muscle cut through and turned down.
- f. External portion of the fascia transversalis.
- g. Internal portion of the same fascia.
- h. Fascia lata turned back.
- i. Crural sheath covering the femoral artery.
- k. Crural sheath covering the femoral vein.
- l. Saphæna major vein.
- m. Some part of the semilunar edge of the fascia lata.
- n. Anterior crural nerve.
- o. Iliacus internus muscle.
- p. Seat of the crural arch to which the sheath adheres.
- q. Portion of the crural sheath passing behind the third insertion of the external oblique muscle.
- r. Opening in the fascia transversalis for the passage of the spermatic cord.
- s. Two lines which include the spot at which the crural hernia descends, and which is situated at the inner and upper part of the crural sheath.†

FIG. 6. Shews the crural sheath cut open.

- a. Pubes.
- b. Ilium.
- cc. Transversalis muscle and tendon.
- d. Insertion of the external oblique turned down.
- ee. Fascia transversalis at its inner part, the epigastric artery and vein are seen.
- ff. Sheath cut open.—g. Femoral artery.—h. Femoral vein.—i. Saphæna major.—k. Epigastric artery and vein.—l. Circumflexa ilii.
- m. Internal abdominal opening for the spermatic cord.
- n. Space between the crural sheath and femoral vein, shewing the part at which the crural hernia descends.

FIG. 7. Artery and vein removed from the sheath.

- a. Pubes.—b. Ilium.—c. Fascia transversalis.—d. Aperture in it.—e. Fascia transversalis.—f. Anterior part of the crural sheath cut open.—g. Femoral artery.—h. Femoral vein.—i. Opening of the sheath from the abdomen.—k. Iliacus internus.—l. Fascia iliaca forming the posterior part of the crural sheath, and sending forwards a process between the crural artery and vein.

FIG. 8. Anterior view of the crural arch, a hernial sac having been removed from it to shew the orifice by which the crural hernia descends.

- a. Seat of the symphysis pubis.
- b. Crural arch.—cc. Fascia lata.
- d. Semilunar edge of the fascia lata.
- e. Crural sheath.—f. Abdominal ring.
- g. Spermatic cord.—h. Femoral artery.
- i. Femoral vein.
- k. Anterior column of the crural sheath, which requires division in the operation for the crural hernia.
- l. Lower column of the same opening.
- m. The hole in the side of the sheath by which the crural hernia descends.

FIG. 9. Posterior view of the same preparation.

- a. Symphysis pubis.—b. Ilium.—c. Pubes.
- d. Rectus muscle.—e. Other abdominal muscles.—f. Fascia transversalis.
- g. Spermatic artery and vein going through the internal abdominal ring.
- h. Femoral artery.—i. Femoral vein.
- k. Fascia between these vessels.
- l. Epigastric artery.
- m. The aperture by which the crural hernia quits the abdomen.
- n. The fascia forming the outer part of the stricture.
- o. That forming the inner.
- p. Fascia and posterior edge of the external oblique muscle forming that part of the stricture which requires division in the operation, if the division of the anterior column of the crural sheath *k* in the former figure is insufficient.

* To see this it is necessary to cut away some fibres covering the crural sheath.

† To make a similar preparation it is necessary that the semilunar edge of the fascia lata should be raised, and the finger be carried behind the edge of the crural arch.

PLATE IV.

THIS plate is intended to exhibit different views of crural herniæ in the female, in the order in which the parts appear in dissection.

FIG. 1. First dissection of the crural hernia.

- a. Symphysis pubis.
- b. Spinous process of the ilium.
- c. Situation of the crural arch, or Poupart's ligament.
- dd. Tendon of the external oblique muscle.
- e. Superficial fascia raised from the external oblique muscle.
- fff. Superficial fascia.
- g. Saphena major vein, the superficial fascia being cut away to shew it.
- h. A part of the superficial fascia attached to the crural arch.
- i. Abdominal ring and round ligament passing through it.
- k. Superficial fascia raised from the hernia.
- ll. Fascia propria raised from the hernial sac.
- mm. Hernial sac.
- n. Omentum within the hernial sac.
- o. Intestine within the hernial sac.

FIG. 2. Shews the form and contents of the hernial sac which has been removed from figure 1.

- aa. Hernial sac.
- b. Neck of the hernial sac.
- c. Omentum within the hernia.
- d. Intestine within the hernia.
- e. Omentum at the mouth of the hernial sac.
- f. The intestine at the mouth of the sac.

FIG. 3. Shews the origin and appearance of the fascia propria.

- a. Seat of symphysis pubis.
- b. Spinous process of the ilium.
- cc. Abdominal muscles.
- d. Crural arch.
- e. Abdominal ring.
- f. Ligamentum rotundum uteri.
- g. Fascia lata.
- h. Portion of the fascia lata over the pectineus muscle.
- ii. Fascia propria, or protruded crural sheath, which covered the hernial sac after the sac in fig. 2 had been removed.
- k. Attachment of the fascia propria to the sheath of the femoral vessels.
- l. A portion of the sheath covering the crural vessels, exposed by removing the semilunar edge of the fascia lata.
- m. The opening in the sheath through which the hernia had descended, above which is seen a dotted line, which marks the seat of the anterior stricture, and which is the part generally required to be divided.*

FIG. 4. A posterior view of the same preparation.

- a. Seat of symphysis pubis.
- b. Spinous process of the ilium.
- c. Abdominal muscles.
- d. Rectus muscle.
- ee. Muscles of the thigh.
- f. Posterior edge of the crural arch.
- g. Fascia iliaca.
- hh. Fascia transversalis.
- i. Round ligament passing into the abdominal ring.
- k. External iliac artery.
- l. External iliac vein.
- m. Epigastric artery and vein.
- n. Obturator artery arising from the epigastric, and passing on the outer side of the crural opening.
- o. Meeting of the insertion of the external oblique into the ligament of the pubes, with the fascia iliaca.
- p. The crural orifice by which the hernial sac had descended, and a dotted line is extended from it, marking the situation of the posterior edge of the crural arch, covered by a fascia, which forms the posterior seat of the stricture.
- q. Fascia between the crural vein and mouth of the sac; this opening is, therefore, formed above by the sheath and the posterior edge of the crural arch, on the inner side by the semicircular insertion of the external oblique muscle, and externally by a

fascia descending on the inner side of the crural vein, which is a process of the crural sheath.

FIG. 5. A small crural hernia dissected.

- a. Seat of symphysis pubis.
- b. Spinous process of the ilium.
- c. Tendon of external oblique muscle.
- d. Anterior edge of the crural arch.
- e. Abdominal ring.
- f. Superficial fascia turned from the external oblique.
- g. Superficial fascia upon the fascia lata.
- h. Crural vein.
- i. Absorbent gland thrust down by the hernia.
- k. Superficial fascia opened where it covered the hernia.
- l. Fascia propria of the hernial sac.
- m. Hernial sac unopened.

FIG. 6. The same preparation farther dissected.

- a. Seat of the symphysis pubis.
- b. Seat of the spinous process of the ilium.
- c. Tendon of the external oblique muscle.
- d. Internal oblique and transversalis.
- e. Fascia of the transversalis.
- f. Tendon of the transversalis.
- g. Inner portion of the fascia transversalis passing to unite itself with the tendon.
- h. The crural arch.
- ii. Round ligament.
- k. The round ligament passing into the abdomen.
- l. Femoral artery.
- m. Femoral vein.
- n. Origin of the epigastric artery.
- o. Course of the epigastric artery behind the round ligament.
- p. Crural nerve.
- q. Superficial fascia.
- r. Fascia propria of the crural hernia, the hernial sac having been drawn into the abdomen to shew this fascia distinctly.

FIG. 7. A small crural hernia in the female, shewing its passage through the crural sheath, and its distance from the crural arch.

- a. Seat of the symphysis pubis.
- b. Spinous process of the ilium.
- c. Crural arch.
- d. Abdominal ring.
- e. Fascia lata.
- f. Semilunar edge of the fascia lata.
- g. Portion of the crural sheath.
- h. Saphena major vein passing into the crural sheath.
- i. Hernial sac inclosed in its fascia, which is extremely dense, and is proportionally so as the hernia is small.
- k. The opening in the crural sheath through which the hernia passes.

FIG. 8. A small hernia in the male to shew the origin of the fascia propria.

- a. Seat of symphysis pubis.
- b. A portion of the crural arch.
- c. Insertion of the external oblique into the pubes.
- d. Portion of the fascia transversalis descending to unite itself to the crural vein.
- e. Portion of the crural vein.
- ff. Edge of the fascia lata cut from Poupart's ligament, and drawn downwards to expose the parts behind.
- g. Fascia lata wrinkled by its falling down.
- h. Semilunar edge of the fascia lata.
- i. Saphena major vein passing into the crural sheath.
- k. The portion of the crural sheath which covered the crural hernia, and forming the fascia propria, the hernial sac having been entirely removed, will be seen in plate 8.
- ll. The aperture by which the crural hernia had descended from the abdomen.
- m. A depression within the crural sheath, in which a process of the hernial sac was contained.

* This is the preparation on which for several years I have been in the habit of shewing the bag which encloses the hernial sac in my lecture on crural hernia.

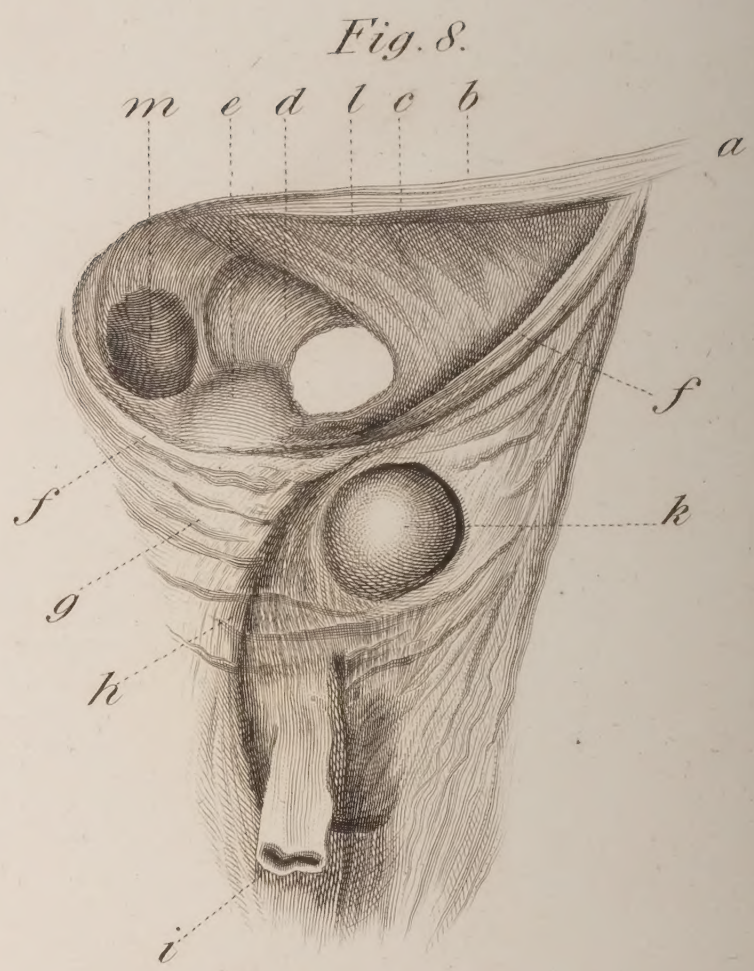
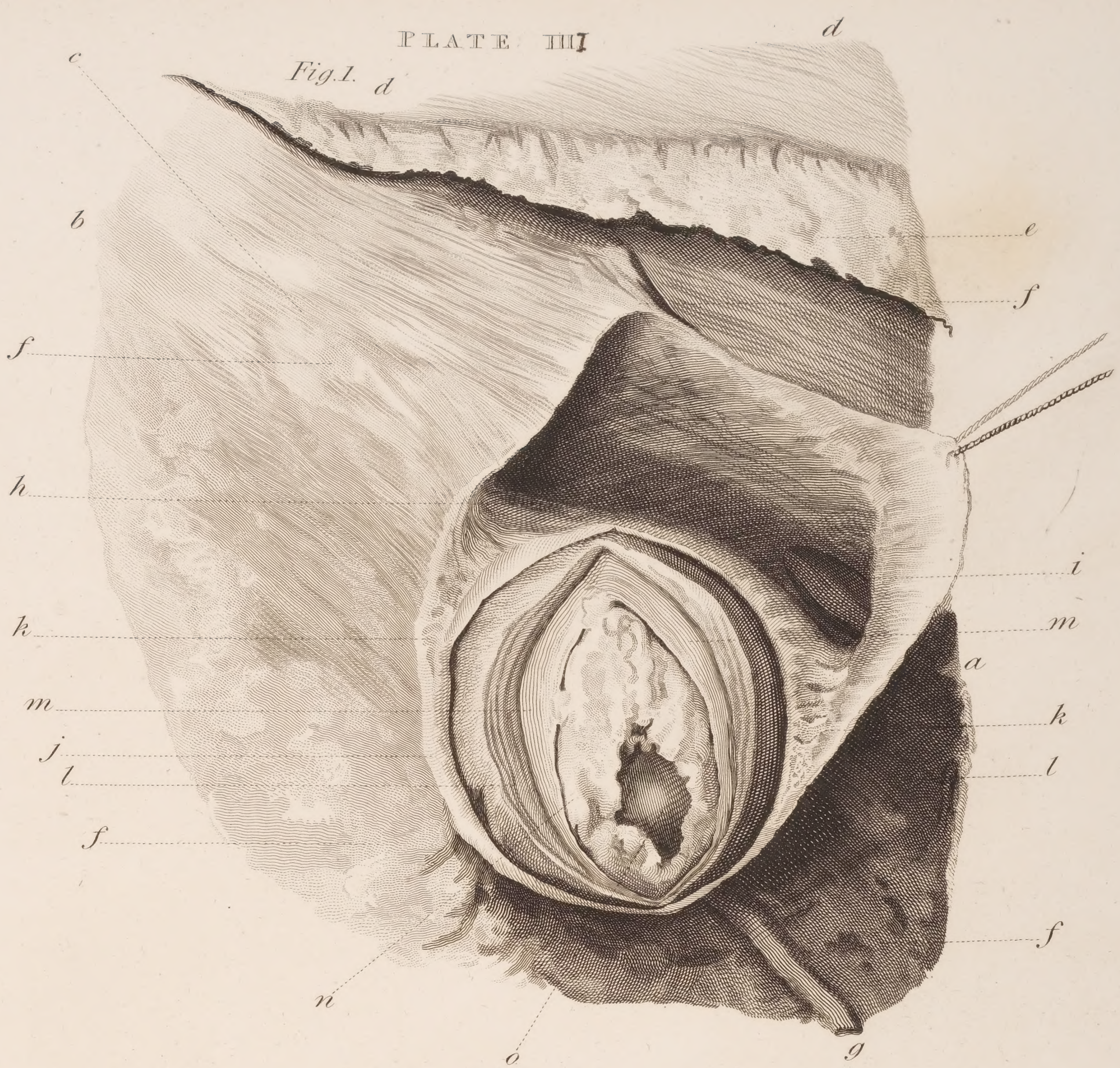
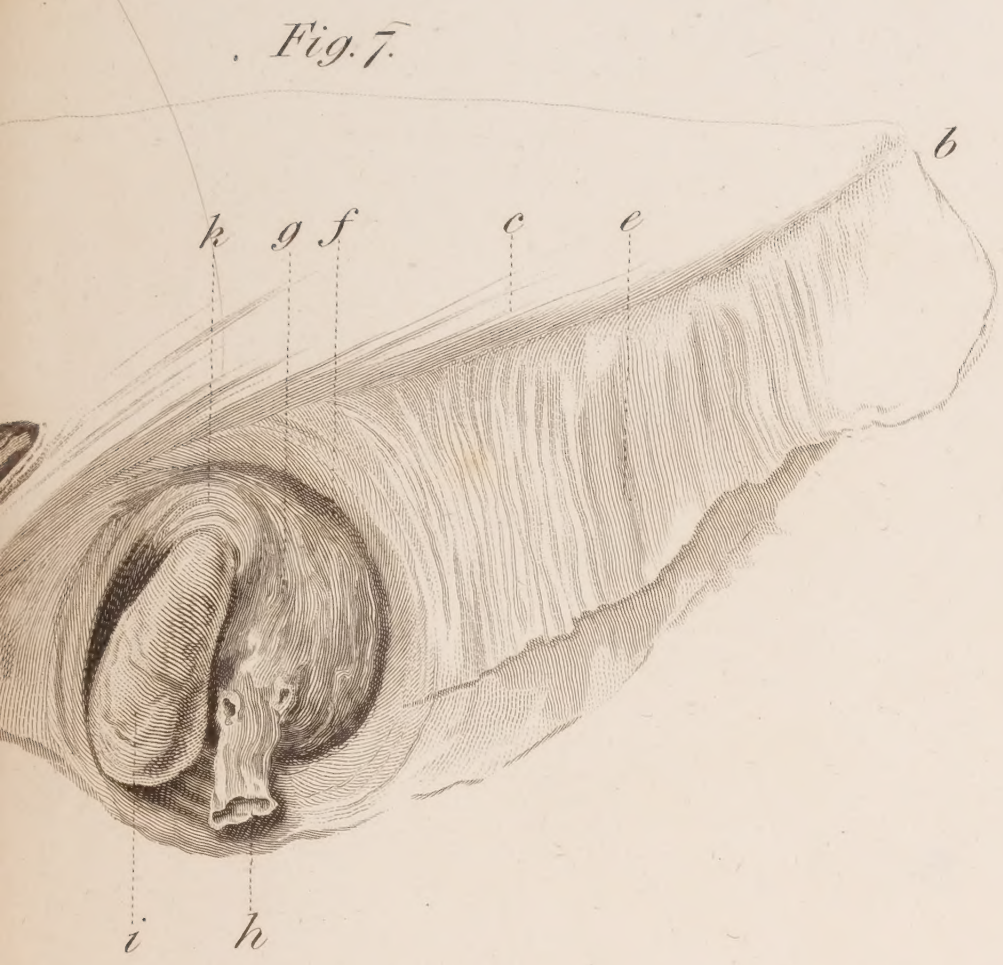


Fig. 3.



Fig. 1.

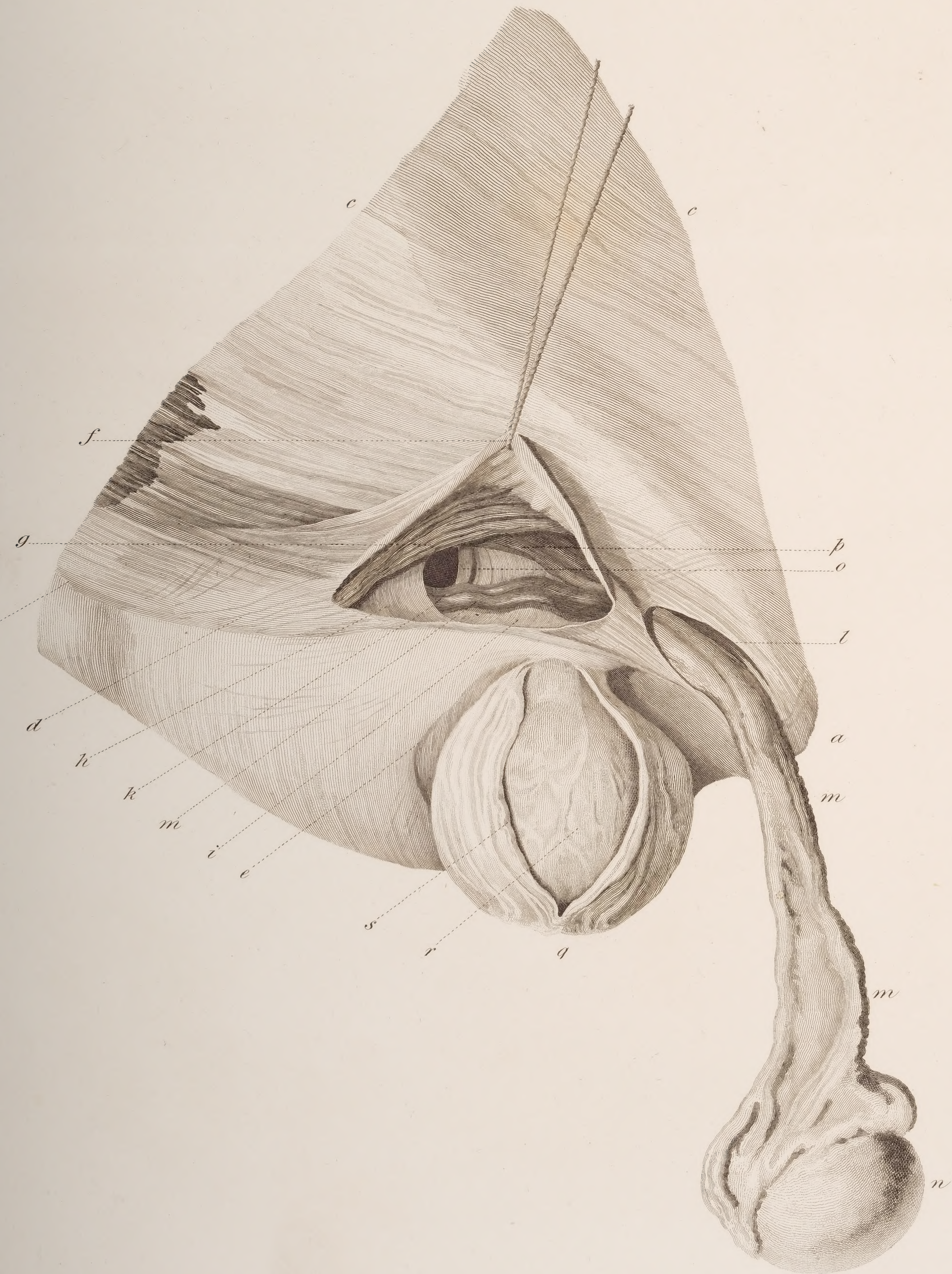


Fig. 2.



PLATE V.

THIS plate exhibits three different views of the crural hernia in the male. Figure 1 is preserved in the collection at Guy's Hospital. Figure 2 is in my own possession.

- FIG. 1.** *a.* Symphysis pubis.
b. Spinous process of the ilium.
cc. Abdominal muscles.
d. The crural arch, or Poupart's ligament.
e. Semilunar edge of the fascia lata.
f. Tendon of the external oblique cut open.
g. Internal oblique and transversalis.
h. External portion of the fascia transversalis.
i. Internal portion of the same fascia.
k. Internal abdominal ring.
l. External abdominal ring.
mmm. Spermatic cord passing through both apertures to the testis.
n. Testis.
o. Epigastric artery.
p. Cremaster muscle.
q. Crural hernia.
r. The sac of the crural hernia.
s. The fascia propria, which covers the hernial sac.

FIG. 2. Anterior view of another crural hernia.

- a.* Symphysis pubis.
b. Spinous process of the ilium.
c. Abdominal muscles.
d. Crural arch, or Poupart's ligament.
e. Abdominal ring.
f. Spermatic cord.

- g.* Testis.
h. Crural hernia.
ii. Superficial fascia cut open and turned back.
kk. Fascia propria of the sac laid open.
ll. Hernial sac opened.
m. Omentum seen within the sac.

FIG. 3. Posterior view of figure 1.

- a.* Symphysis pubis.
b. Spinous process of the ilium.
c. Ilium cut through.
ddd. Rectus and other abdominal muscles.
e. Linea semilunaris.
f. Posterior edge of the crural arch.
g. Fascia iliaca.
h. The iliacus internus muscle.
ii. Fascia transversalis.
k. Internal abdominal ring.
l. Spermatic cord passing through the internal ring.
m. External iliac artery.
n. External iliac vein.
o. Epigastric artery and vein.
p. Sac of crural hernia.
q. Mouth of the sac.
r. Absorbent gland between the hernial sac and the iliac vein.

PLATE VI.

EXHIBITS an anterior and posterior view of two inguinal and a crural hernia in the same subject. Also views of the trusses which are required in large crural herniæ. The common inguinal truss may be applied for a small crural hernia; but in the larger, a truss which approaches the right angle is required, as the motions of the thigh displace the inguinal truss when put below the crural arch.

FIG. 1. Anterior view of a crural and two inguinal herniæ.

- a.* Symphysis pubis.
- b.* Spinous process of the ilium.
- cc.* Crural arch sending off the fascia lata of the thigh.
- dd.* Semilunar edge of the fascia lata.
- ee.* Saphena major vein on each side.
- ff.* Abdominal rings.
- g.* Sac of the inguinal hernia on the left side.
- h.* Its fascial covering.
- i.* Inguinal hernial sac on the right, its cavity obliterated by adhesion.
- k.* Sac of crural hernia.
- m.* Its orifice which had been dilated inwards in the operation for this hernia.

FIG. 2. Posterior view of the same preparation.

- aa.* Seat of the spinous processes of the ilia, the upper *a* pointing to the abdominal muscles a little below the umbilicus.

- b.* The bladder contracted.
- c.* The uterus drawn to the right side towards the mouth of the hernial sac.
- dd.* Ovaria.
- ee.* Fallopian tubes.
- ff.* Ligamenta rotunda.
- g.* Orifice of the sac of the inguinal hernia on the left side.
- h.* Orifice of the crural hernia.
- i.* Sac of the right inguinal shut by adhesion.
- kk.* Epigastric artery and vein.

FIG. 3. *a.* Inguinal truss.
b. Crural truss.

FIG. 4. *d.* Truss for the large crural hernia.
e. Upper abdominal opening.
f. The place at which the crural hernia descends.
g. Lower abdominal opening or ring.

Fig. 1.

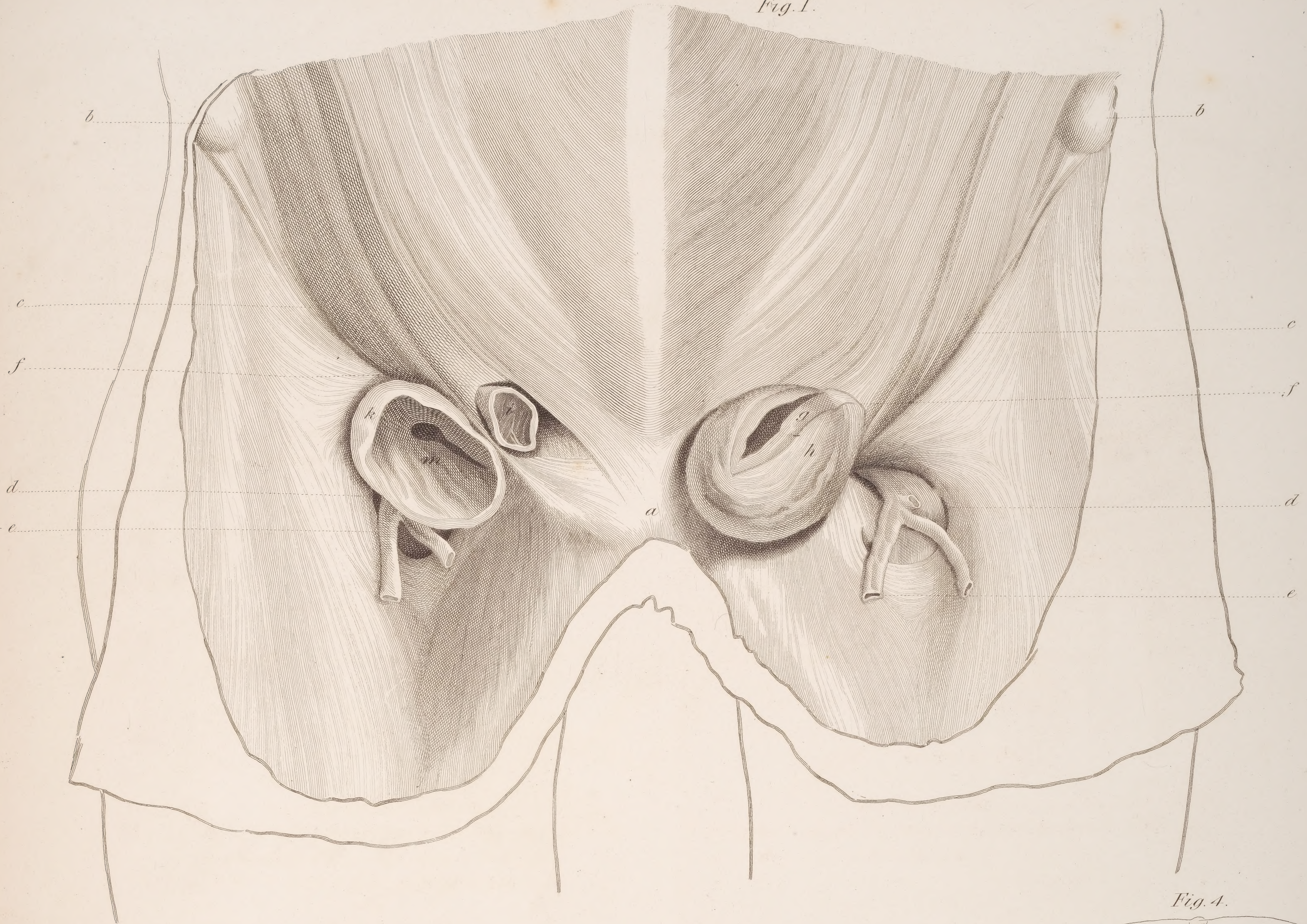


Fig. 4.

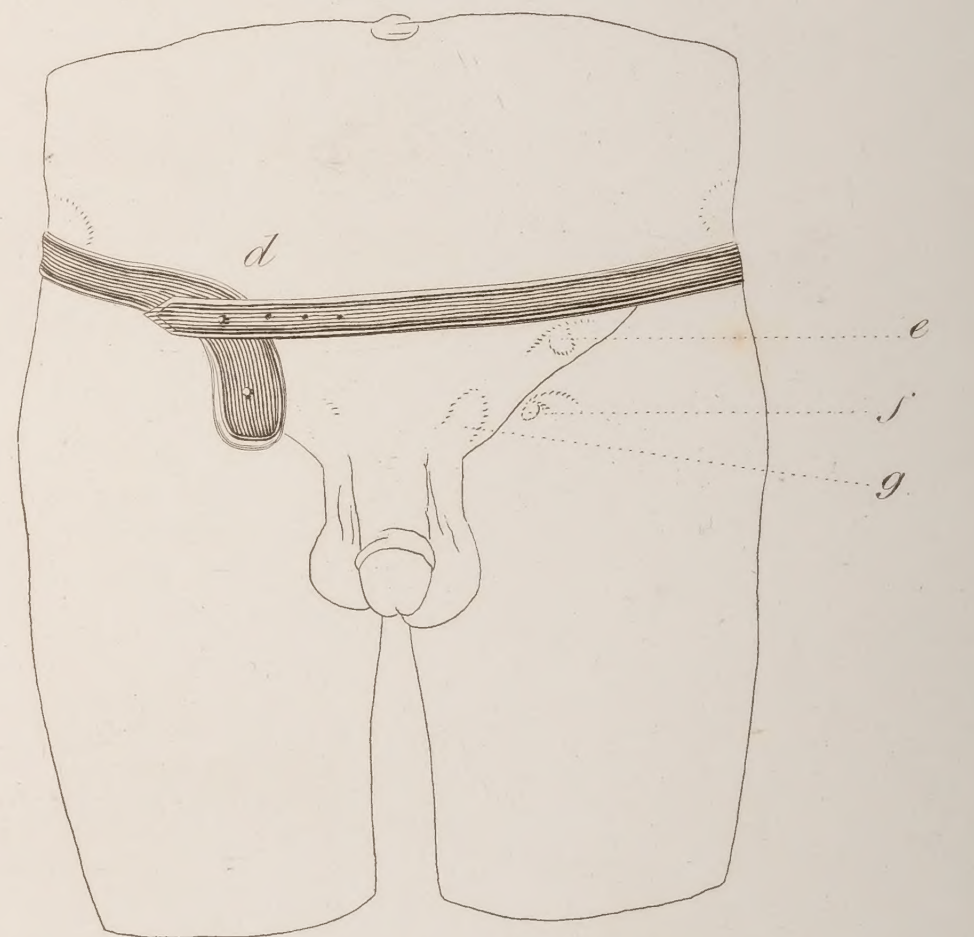


Fig. 3.

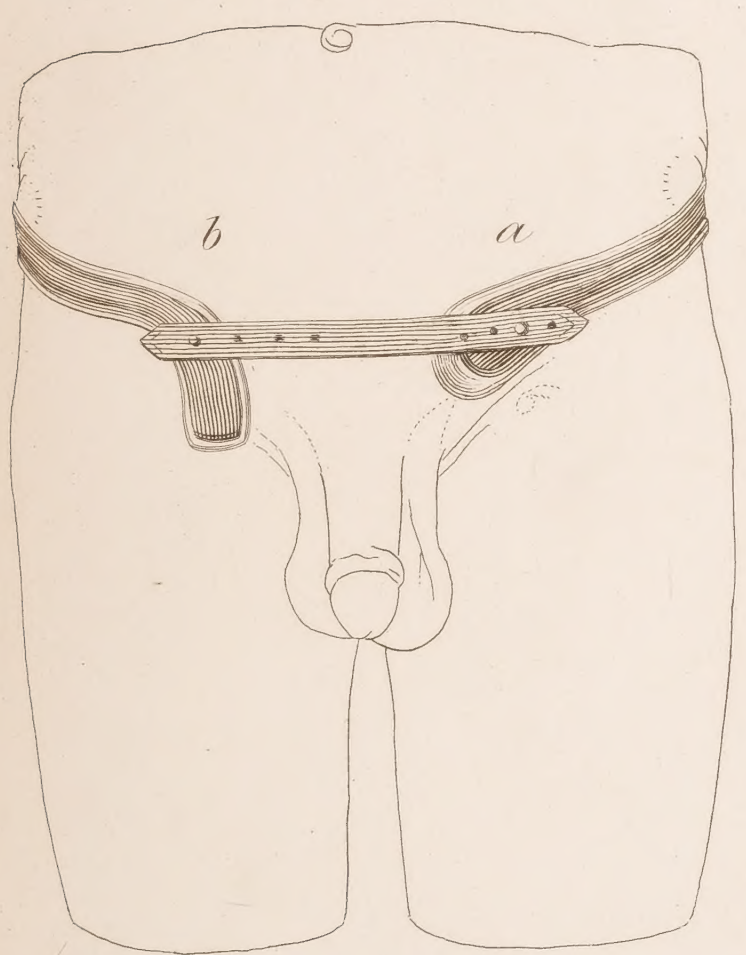
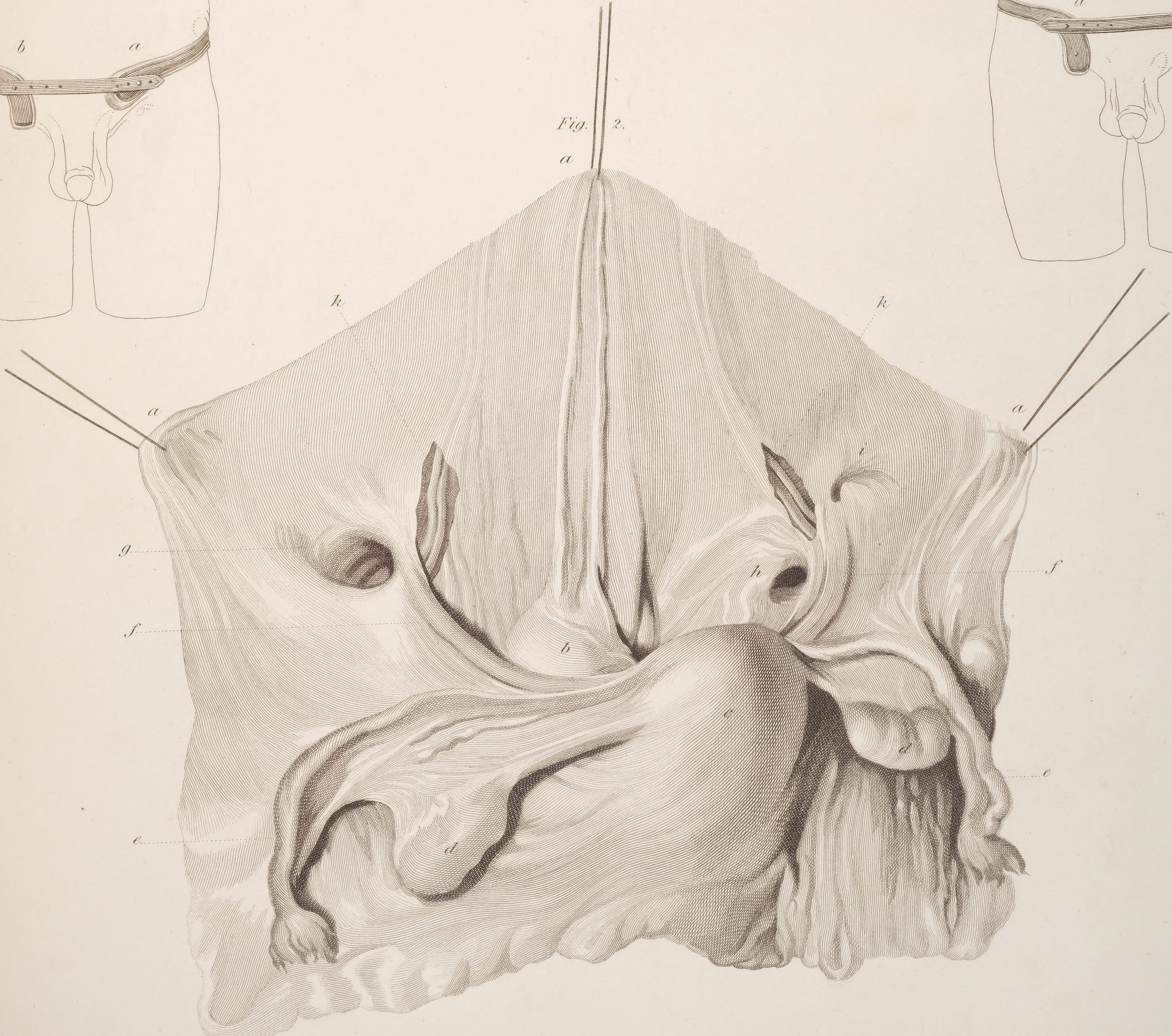


Fig. 2.



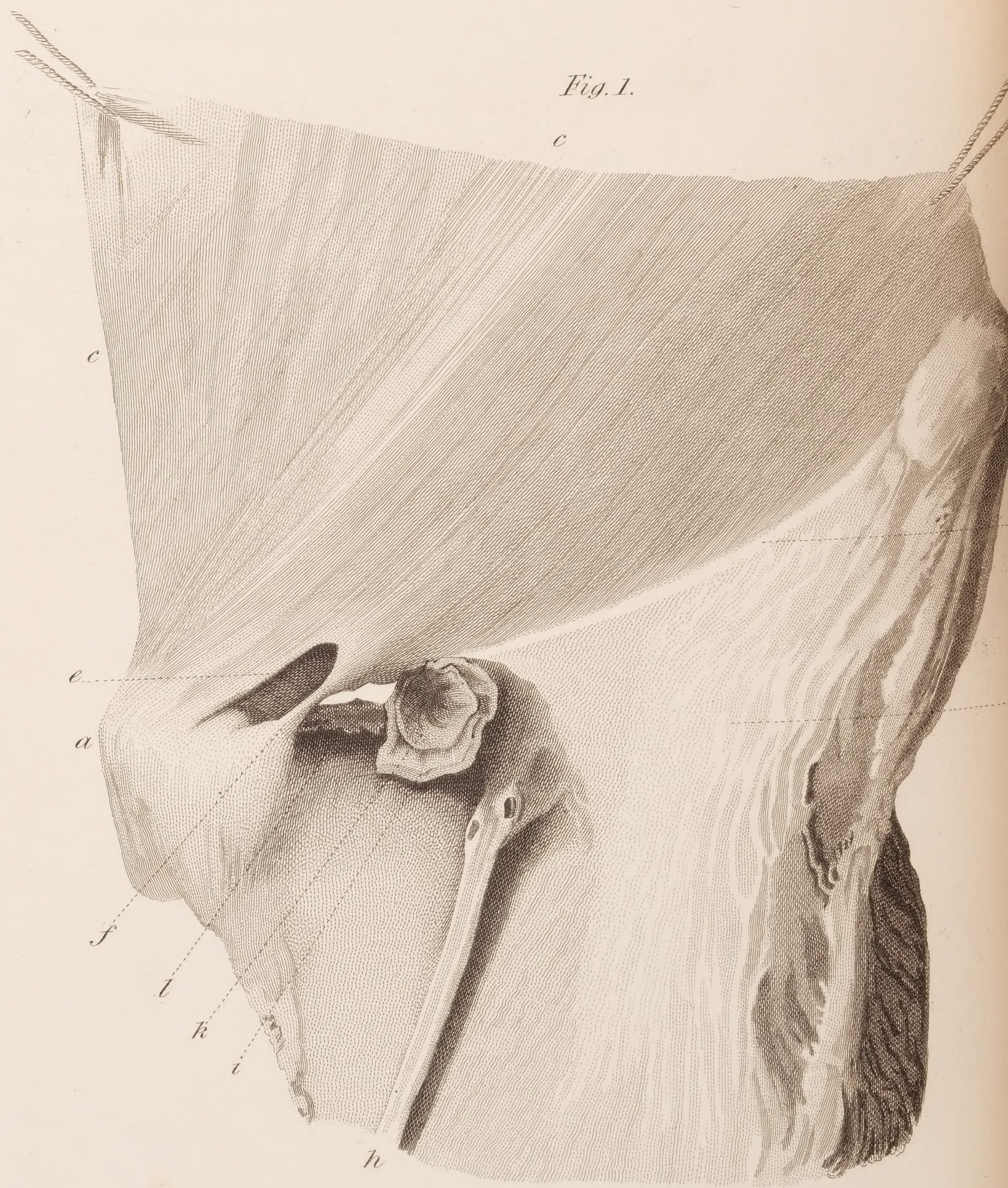
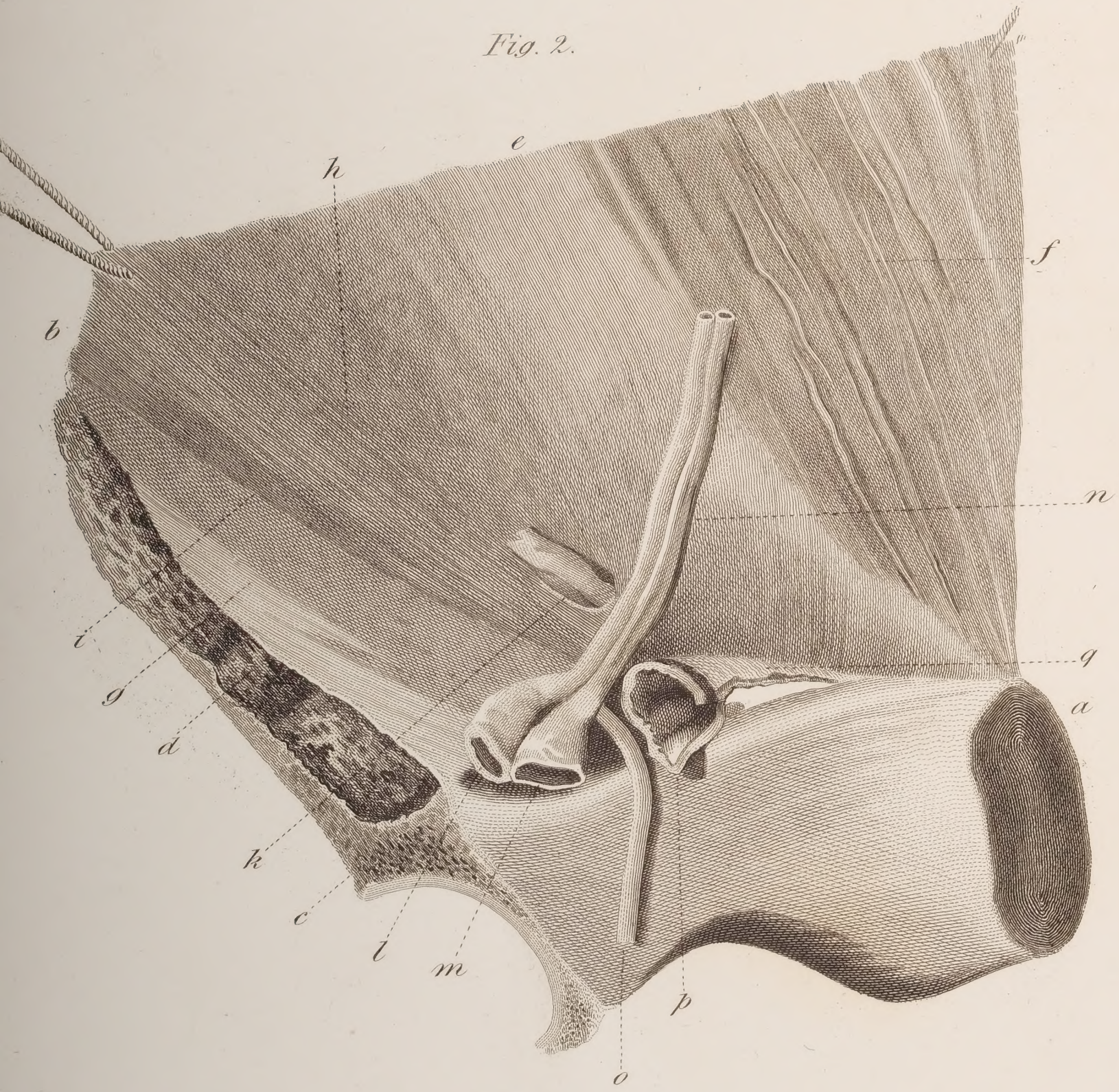
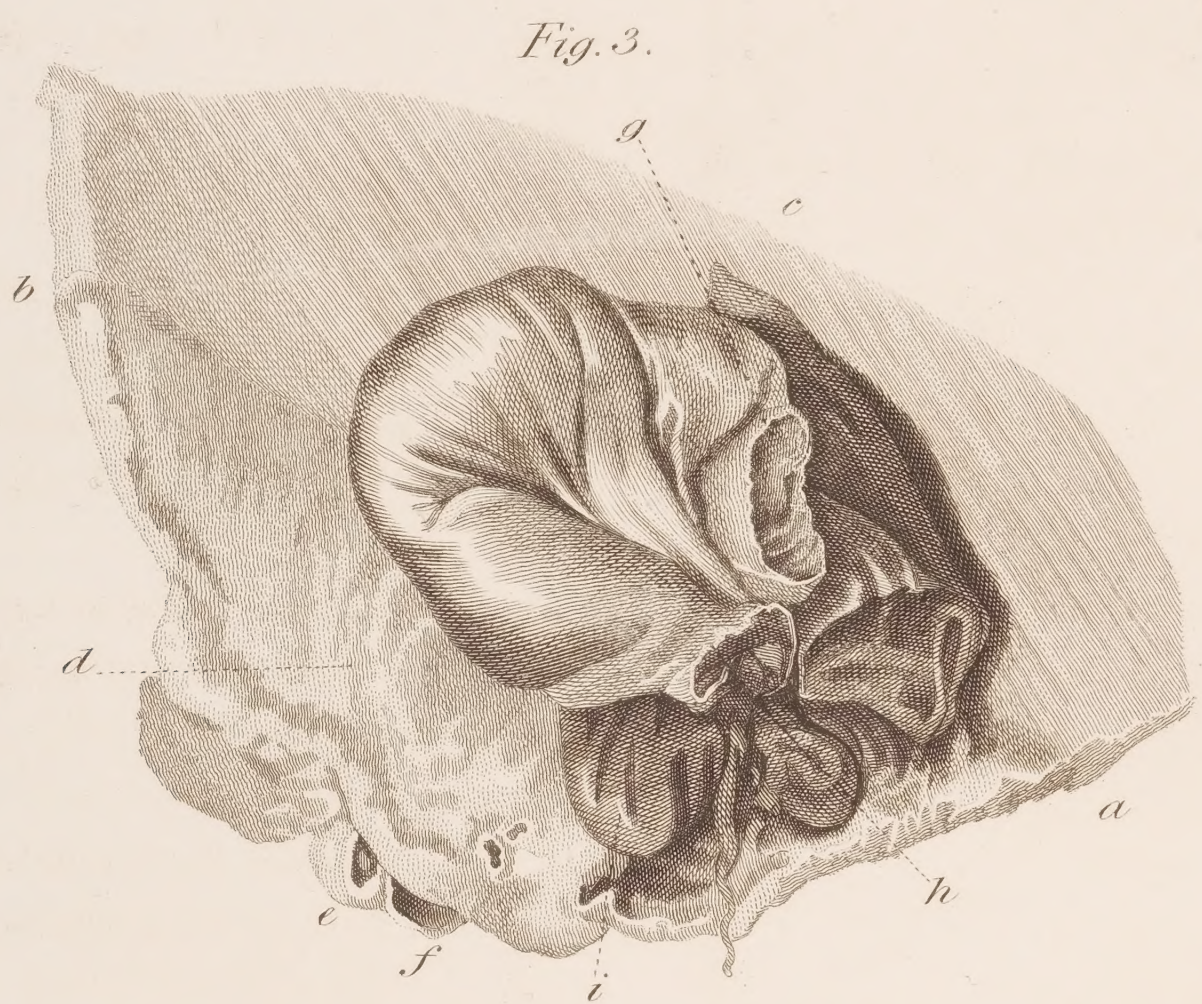
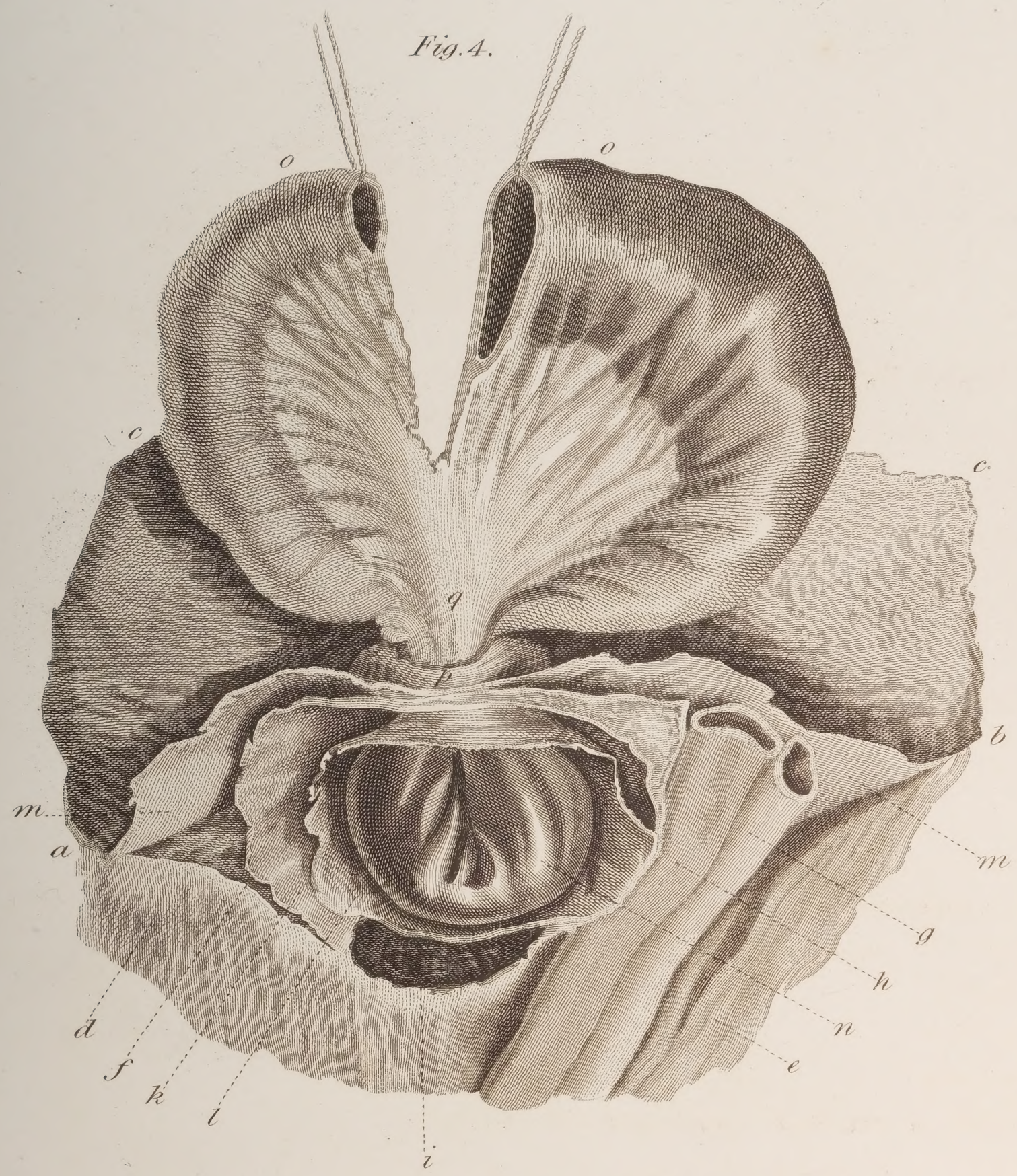


PLATE VII.

CONTAINING different views of preparations made after the operation for crural hernia.

FIG. 1. Anterior view of a crural hernia operated on by cutting directly inwards.

- a.* Symphysis pubis.
- b.* Spine of the ilium.
- c c.* Abdominal muscles.
- d.* Crural arch.
- e.* Abdominal ring.
- f.* Lower column of the ring inserted into the tubercle of the pubes.
- g.* Fascia lata.
- h.* Saphæna major vein.
- i.* Fascia propria, or protruded crural sheath.
- k.* Hernial sac included in the former.
- l.* Insertion of the external oblique muscle into the ligament of the pubes, divided in the operation.

FIG. 2. Posterior view of the same.

- a.* Symphysis pubis.
- b.* Spine of the ilium.
- c.* Ilium.
- d.* Iliacus internus.
- e.* Abdominal muscles.
- f.* Rectus abdominis.
- g.* Fascia iliaca.
- h.* Fascia transversalis.
- i.* Junction of the two fascia at the posterior edge of the crural arch.
- k.* Internal abdominal ring, and the round ligament passing through it.
- l.* Iliac artery.
- m.* Iliac vein.
- n.* Epigastric artery and vein.
- o.* Obturator artery passing from the epigastric, but taking its course on the outer side of the hernial sac.
- p.* Hernial sac.
- q.* The insertion of the external oblique muscle, which had been divided in the operation inwards.

FIG. 3. A view of a preparation in which the intestine was divided by cutting inwards. See Cases.

- a.* Seat of symphysis pubis.
- b.* Crural arch.
- c.* Abdominal muscles.
- d.* Fascia lata.
- e.* Femoral artery.
- f.* Femoral vein.

- g.* Hole in one fold of the intestine.
- h.* Hole in the other fold.
- i.* Hernial sac.

FIG. 4. Preparation of the hernial sac which had been returned into the abdomen unopened.

- a.* Seat of symphysis pubis.
- b.* Seat of the spine of the ilium.
- c c.* Abdominal muscle.
- d.* Muscles of the thigh.
- e.* Muscles of the outer part of the thigh.
- f.* Crural arch.
- g.* Femoral artery.
- h.* Femoral vein.
- i.* Large hole at the crural arch, by which the hernia was pushed back.
- k.* Fascia propria of the sac, which was also pushed into the abdomen.
- l.* Hernial sac.
- m m.* Peritoneum.
- n.* Strangulated intestine.
- o.* Intestine above the strangulated part.
- p.* Stricture at the mouth of the sac remaining undivided.
- q.* Mesentery.

FIG. 5. A large hernia which had been strangulated, and for which the operation was performed by cutting through the tendon of the external oblique muscle, drawing up the spermatic cord, and cutting the crural arch from the hernial sac. See Cases.

- a.* Seat of the symphysis pubis.
- b.* Spine of the ilium.
- c c.* Abdominal muscles.
- d.* Fascia lata.
- e.* Crural arch.
- f.* Abdominal ring.
- g.* Femoral artery.
- h.* Femoral vein.
- i.* Testis.
- k.* Spermatic cord.
- l.* Fascia propria.
- m.* Hernial sac.
- n.* A hook put under the spermatic cord to draw it from the crural arch, whilst the arch was cut from the hernial sac.

PLATE VIII.

CONTAINS some varieties of crural hernia, viz. a hernial sac, situated within the sheath of the crural vessels, which it had not protruded. A large hernia, having the remains of the umbilical artery placed on the outer part of the mouth of the sac. A hernial sac, which had been contained in part in the sheath, and in part in the common situation. And lastly, the preparation with which I was kindly favoured, for the purpose of having an engraving made of it, by the late Dr. Barclay, Teacher of Anatomy in Edinburgh, shewing the obturator artery passing before the mouth of the hernial sac.

FIG. 1. Hernia within the crural sheath.

- a.* Symphysis pubis.
- b.* Spine of the ilium.
- c.* External oblique muscle raised.
- d.* Internal oblique muscle.
- e.* Transversalis.
- f.* Crural arch.
- g.* Fascia transversalis passing from the crural arch under the transversalis muscle.
- h.* Upper abdominal opening.
- i.* Lower abdominal opening.
- k.* Spermatic cord passing through both of these openings.
- l.* Femoral artery.
- m.* Femoral vein.
- n.* Saphæna major vein.
- o o.* Epigastric artery.
- p.* Crural sheath opened and turned back.
- q.* Hernial sac within the sheath.

FIG. 2. Large hernia descending more inwards than usual, so as to have the umbilical artery on its outer side.

- a.* Pubes.
- b.* Spine of the ilium.
- c.* Internal oblique muscle raised.
- d.* Transversalis muscle raised.
- e e.* Linea semilunaris.
- f.* Rectus muscle.
- g.* Abdominal ring.
- h.* Fascia transversalis.
- i.* Inner part of the same fascia, with the tendon of the transversalis upon it.
- k k.* Fascia lata.
- m m.* Round ligament passing from the abdomen on the fore part of the mouth of the hernial sac.
- n.* Epigastric artery.
- o.* Remains of umbilical artery.
- p.* Mouth of the hernial sac, which had the bladder much dilated resting upon it.
- q.* Superficial fascia, and that of the hernia consolidated into one.

- r r.* Hernial sac.
- s.* Omentum adhering within the sac.

FIG. 3. A hernial sac, part within the sheath, and part in the usual situation.

- a.* Peritoneum.
- b.* Hernial sac, within the crural sheath.
- c.* Hernial sac, which had protruded the sheath in the usual manner.
- d.* Portion of the hernial sac which crossed the crural artery and vein within the sheath.

FIG. 4. Dr. Barclay's preparation.

- a.* One of the lumbar vertebræ.
- b b.* Spinous processes of the ilia.
- c.* Abdominal muscles raised.
- d.* Aorta.
- e.* Bifurcation of the aorta.
- f.* External iliac artery.
- g.* Iliac artery of the left side.
- h h.* Femoral arteries.
- i.* Arteria profunda.
- k.* Epigastric artery on the left side, the rectus muscle being drawn down to shew it.
- l.* Inferior cava.
- m.* External iliac vein.
- n n.* Femoral veins.
- o.* Peritoneum descending to form the hernial sac.
- p.* The hernia.
- q.* Common trunk of the epigastric and obturator arteries.
- r.* Obturator artery passing before and on the inner side of the neck of the sac, in its course to the obturator foramen, and situated a little above the posterior edge of the external oblique muscle.
- s.* Epigastric artery.

An engraving of this preparation has been published in an ingenious Thesis on Crural Hernia, by Dr. James Sanders, Edinburgh, 1805.

Fig. 1.

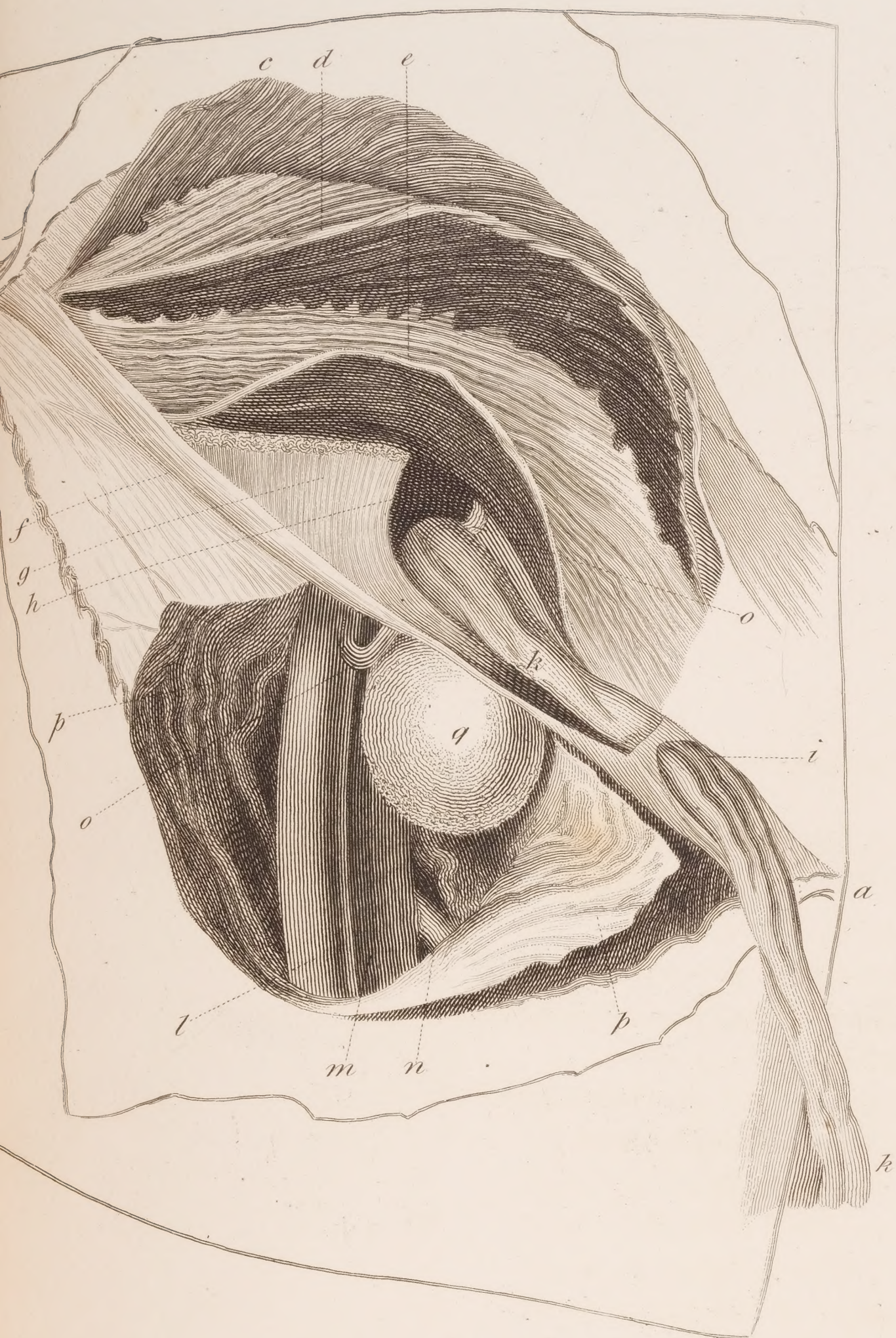


Fig. 2.

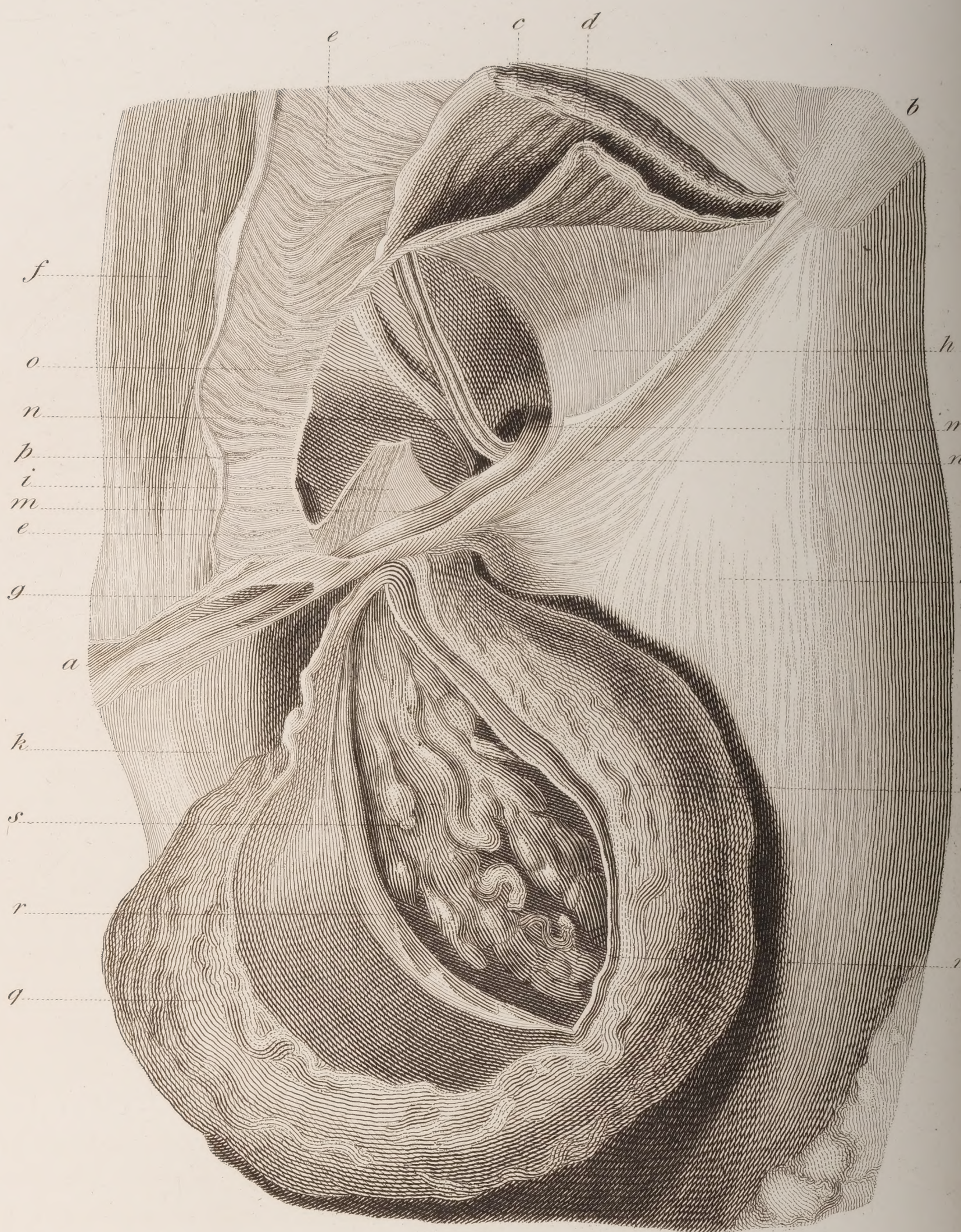


Fig. 3.



Fig. 4.



Fig. 6.

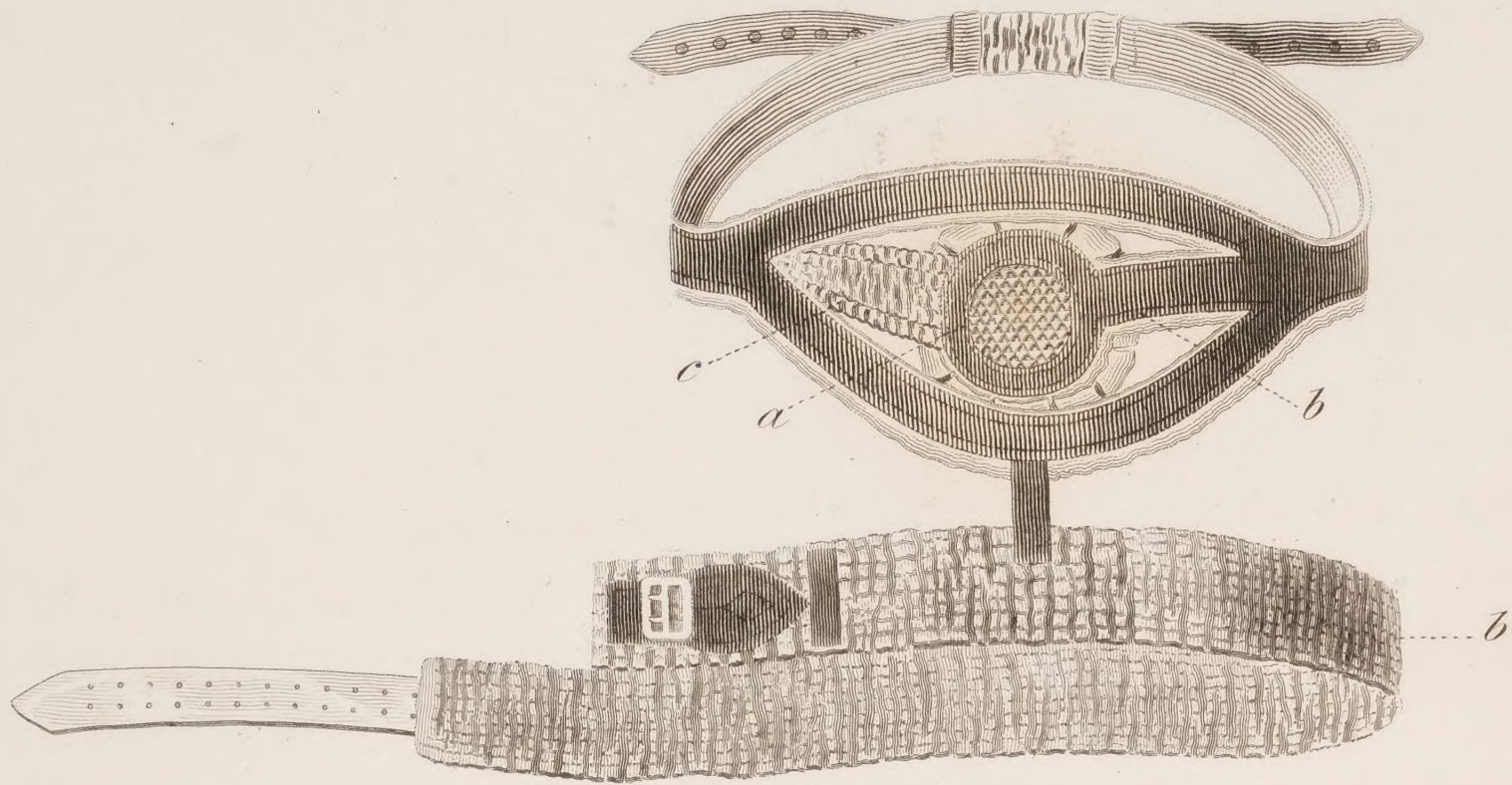


Fig. 8.

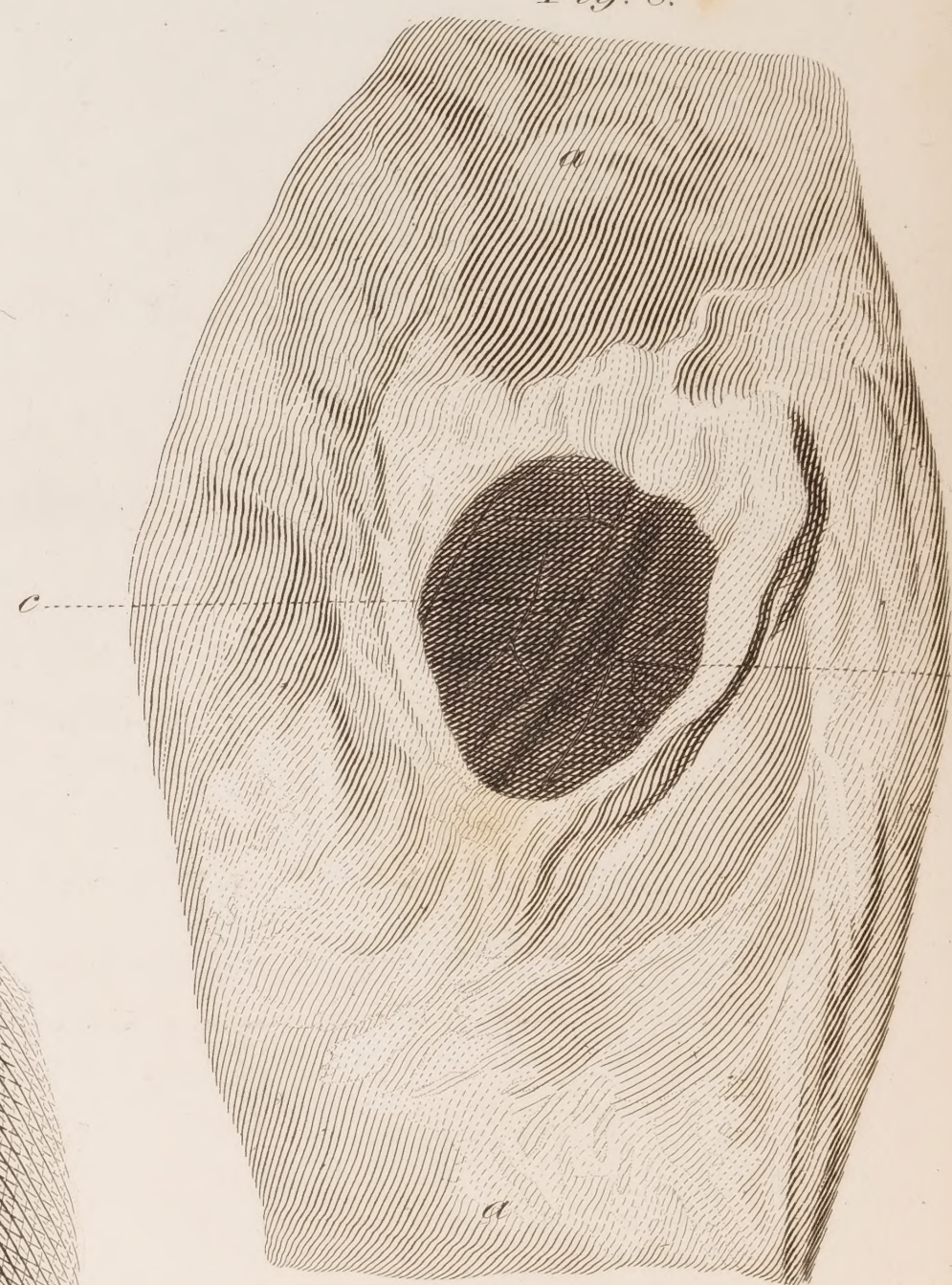


Fig. 3.



Fig. 1.



Fig. 4.

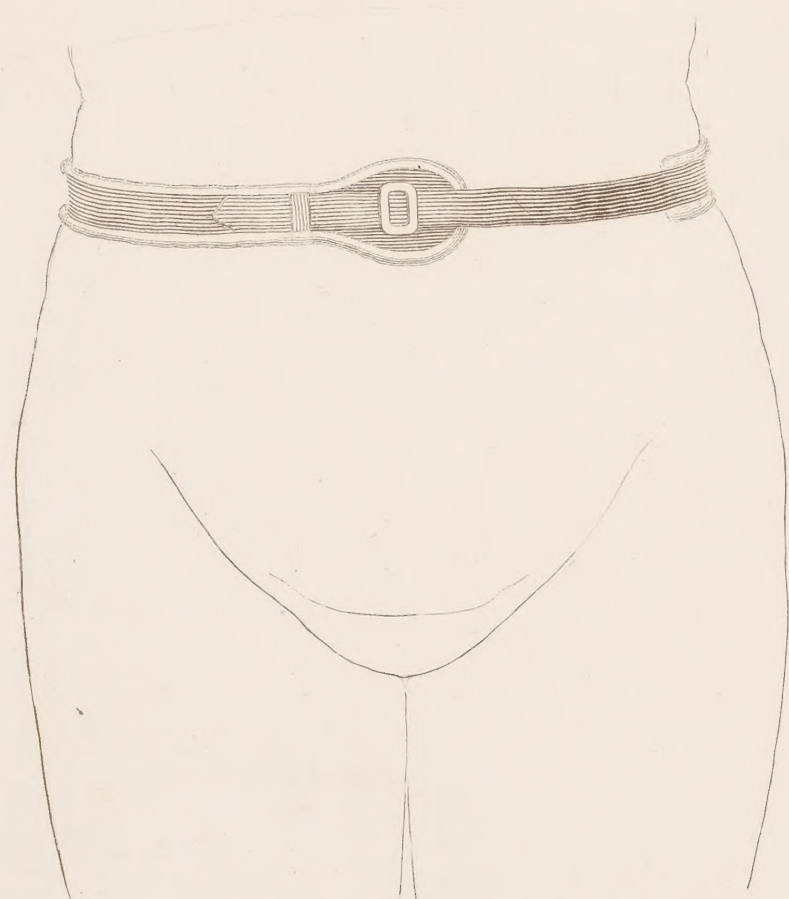


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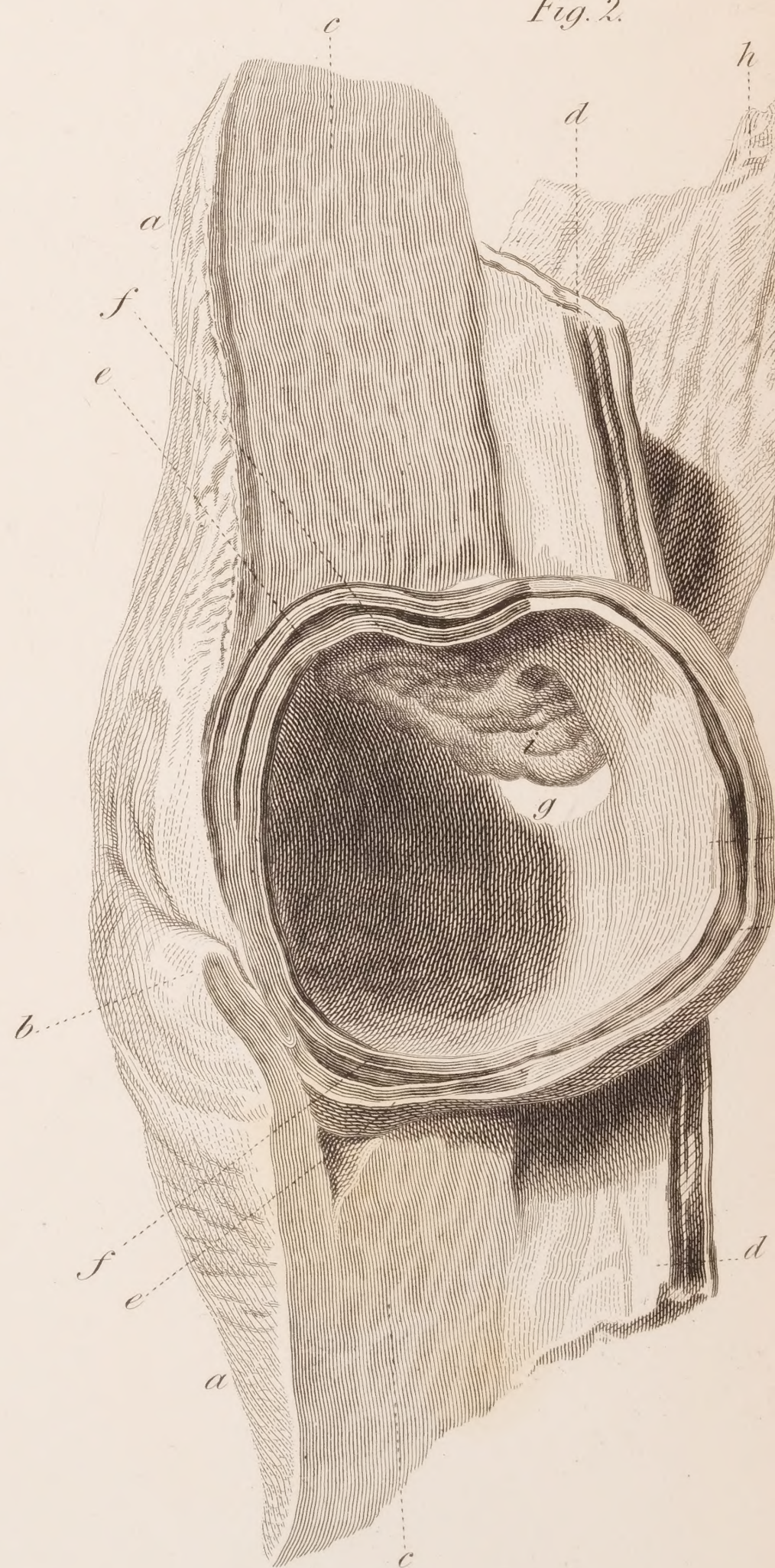


Fig. 5.

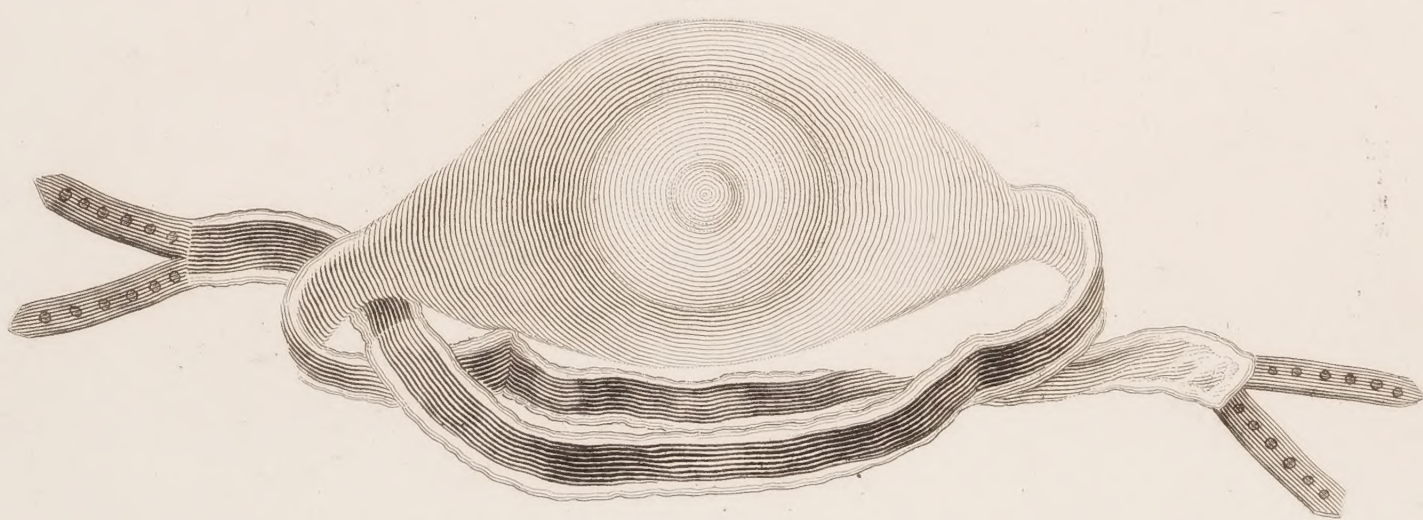


Fig. 7.



PLATE IX.

SHEWS three umbilical herniæ, one of which is curious on account of two small omental herniæ being formed through orifices in the hernial sac. Also the trusses required in umbilical hernia, and two views of a ventral hernia. Fig. 2 and 3 were drawn by Mr. Cliff.

FIG. 1. The common appearance of umbilical hernia.

- aaa.* Integuments.
- bb.* Abdominal muscles.
- ccc.* Peritoneum lining the abdominal muscles.
- d.* Mouth of the hernial sac.
- ee.* Hernial sac.
- ff.* Termination of the linea alba around the mouth of the sac; also seen below at *b*.
- g.* Fascia lining the integuments and covering the sac. In this preparation some omentum adhered within the sac, which was not included in the drawing.

FIG. 2. Umbilical hernia in a very fat person.

- aa.* The common integuments.
- b.* The umbilicus.
- cc.* Adeps between the integuments and abdominal muscles.
- e.* Fascia over the sac.
- f.* Hernial sac. The fascia, sac, and integuments adhering together at the umbilicus.
- g.* Opening of the sac.
- h.* Omentum descending to the sac.
- i.* Omentum adhering within the sac.

FIG. 3. Umbilical hernia.

- aa.* Integuments of the abdomen.
- bb.* Integuments on the sac.
- cccc.* Cicatrices from ulcers on the integuments.
- dd.* Hernial sac.
- eee.* Omentum within the sac, but a part of the sac absorbed so that it adheres to the skin from *l* almost to *k*.

- ff.* Intestine ruptured by a fall. See case.
- g.* An omental hernia.
- h.* A smaller omental hernia.
- i.* The hole in the sac through which the larger passed.
- k.* The hole in the sac through which passed the smaller.
- l.* Two other holes in the hernial sac.

FIG. 4. Truss for a small umbilical hernia; an ivory ball to be worn under it. If the person is corpulent he will require a belt similar to that in fig. 6.

FIG. 5. Truss usually worn by corpulent women for the umbilical hernia.

FIG. 6. Improved truss by Mr. Marrison of Leeds.

- a.* The pad.
- b.* The spring added to the pad.
- c.* An elastic band to assist the pressure of the pad. The lower *b* points to the belt, which is added to keep this truss in its place in corpulent persons.

FIG. 7. Anterior view of the ventral hernia.

- aaa.* Integuments.
- bb.* Tendon of the external oblique, and rectus muscle behind it.
- c.* Hernia.
- d.* Fascia turned from the sac.
- e.* Hernial sac.

FIG. 8. Posterior view of fig. 7.

- aa.* Peritoneum lining the abdominal muscles.
- b.* The mouth of the hernial sac.
- c.* The umbilical vein within the sac.

PLATE X.

CONTAINS an anterior and posterior view of a double umbilical hernia. Also anterior and posterior views of the umbilical hernia, shewing the danger of cutting the intestine within the abdomen. And two views of the ventral hernia, situated in the linea alba, about two inches above the umbilicus.

FIG. 1. Double umbilical hernia.

- aaa.* Abdominal muscles.
- b.* Linea alba.
- c.* Large umbilical hernia. The sac opened. The skin adheres to it.
- d.* Small umbilical hernia situated to the left side of the former, and the sac is opened.

FIG. 2. Posterior view of the same preparation.

- aaaa.* Abdominal muscles.
- b.* Linea alba.
- c.* Orifice of the larger umbilical hernia.
- d.* Orifice of the smaller hernia.
- e.* A band of tendon situated between the two herniæ.

FIG. 3. Umbilical hernia—anterior view.

- aa.* Linea alba.
- bbbb.* Recti abdominis.
- cc.* Lineæ transversales.
- d.* Hernial sac within which the omentum is seen adhering.
- e.* Omentum.

FIG. 4. Posterior view of fig. 3.

- aa.* Recti abdominis.
- bb.* Peritoneum.

- c.* Remains of the umbilical vein.
- dd.* Remains of the umbilical arteries.
- ee.* Epigastric arteries.
- f.* Linea alba.
- g.* Intestine adhering to the orifice of the hernial sac.
- hh.* The omentum glued to the mesentery and to the hernial sac, forming a pouch towards the abdomen.

FIG. 5. Anterior view of a ventral hernia.

- aa.* Abdominal muscles.
- bb.* Linea alba.
- c.* Umbilicus.
- d.* Fascia over this hernia.
- e.* Hernial sac.
- f.* Portions of fat between the fascia and the sac.

FIG. 6. Posterior view of fig. 5.

- aa.* Abdominal muscles.
- bb.* Peritoneum.
- cc.* Portions of adeps at the umbilicus.
- dd.* Umbilical arteries.
- ee.* Umbilical vein.
- f.* Mouth of the ventral hernia.
- g.* Fat adhering to the mouth of the hernial sac, into which the umbilical vein is seen to pass.

Fig. 1.



Fig 2

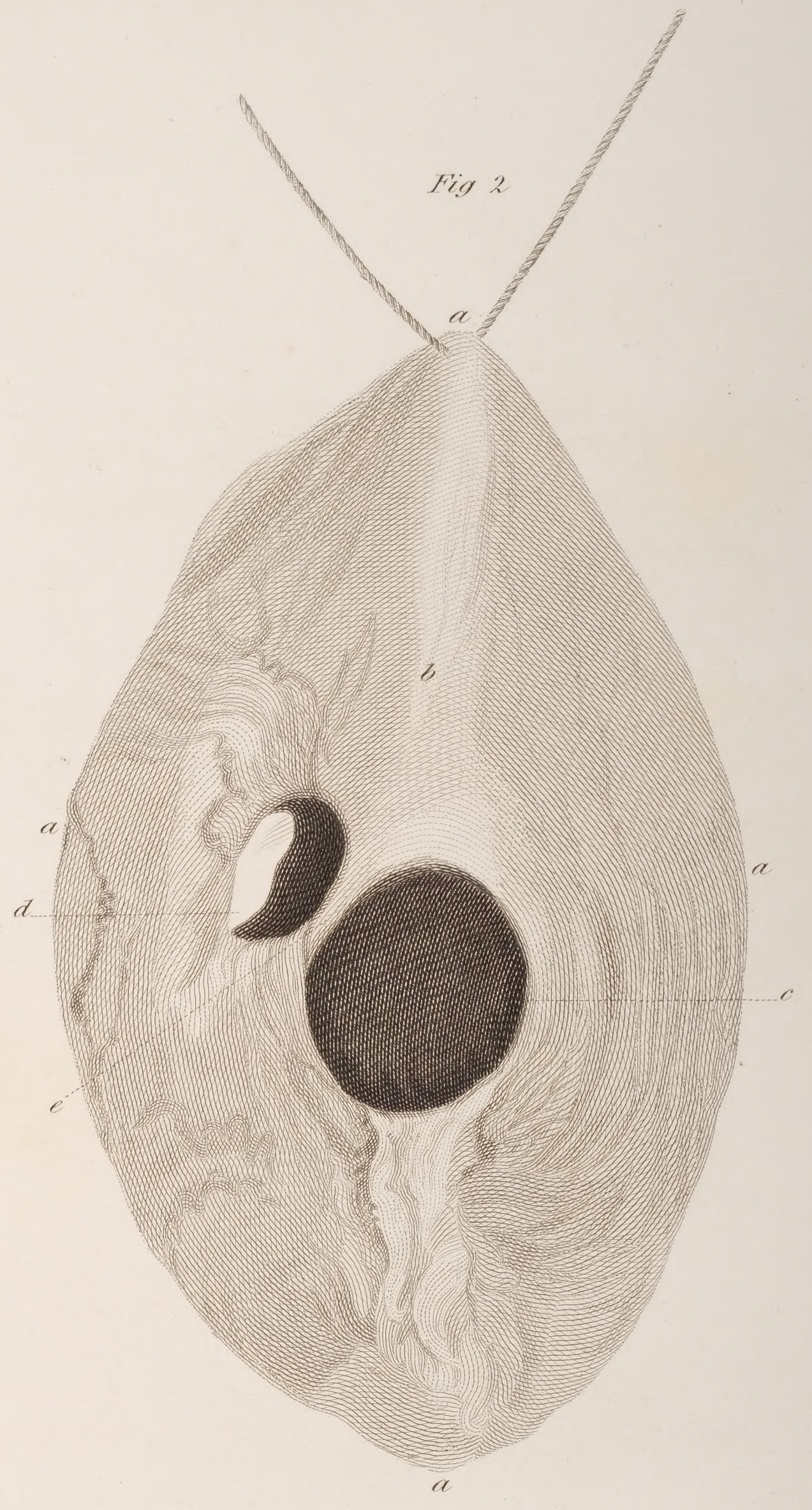


Fig. 6.

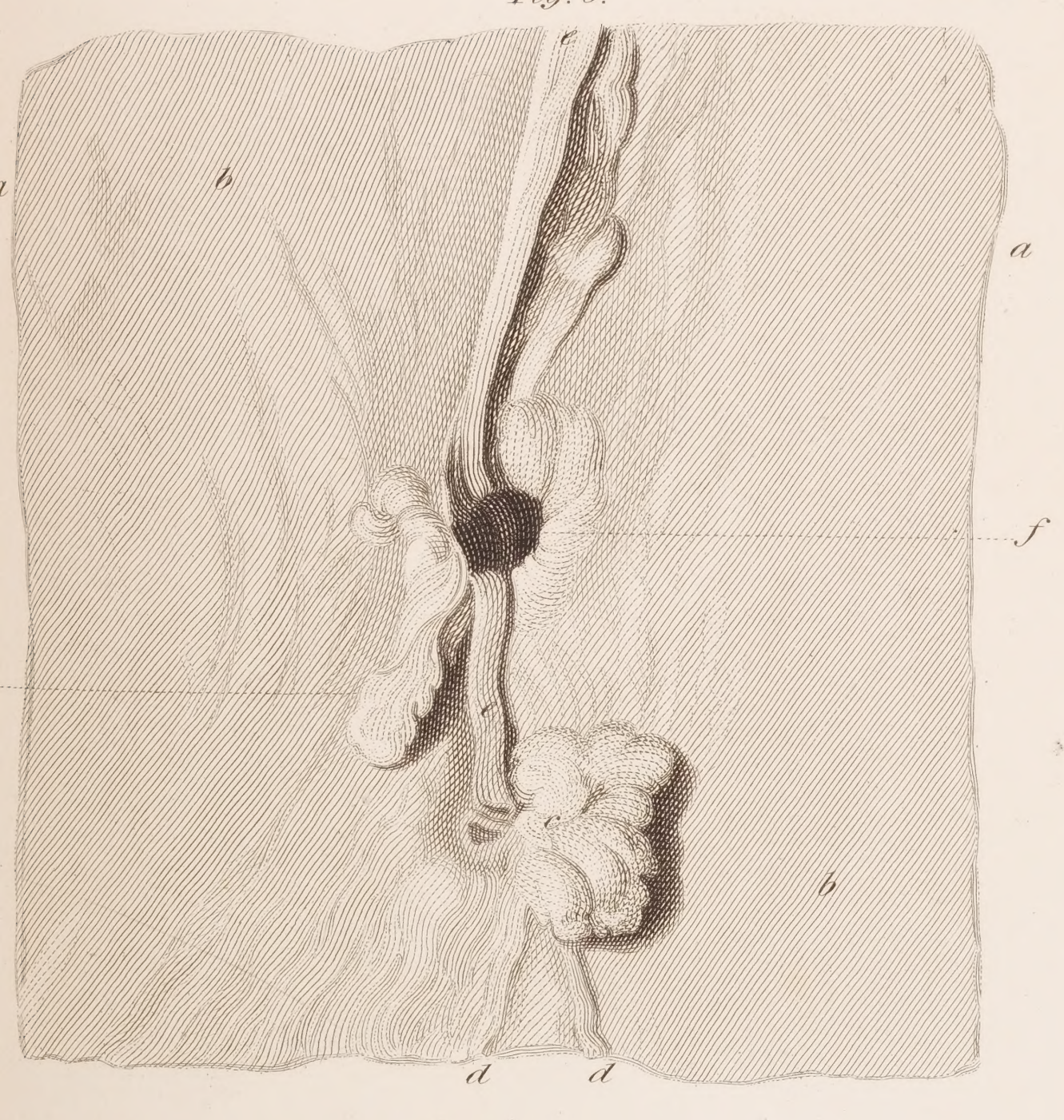


Fig. 4.

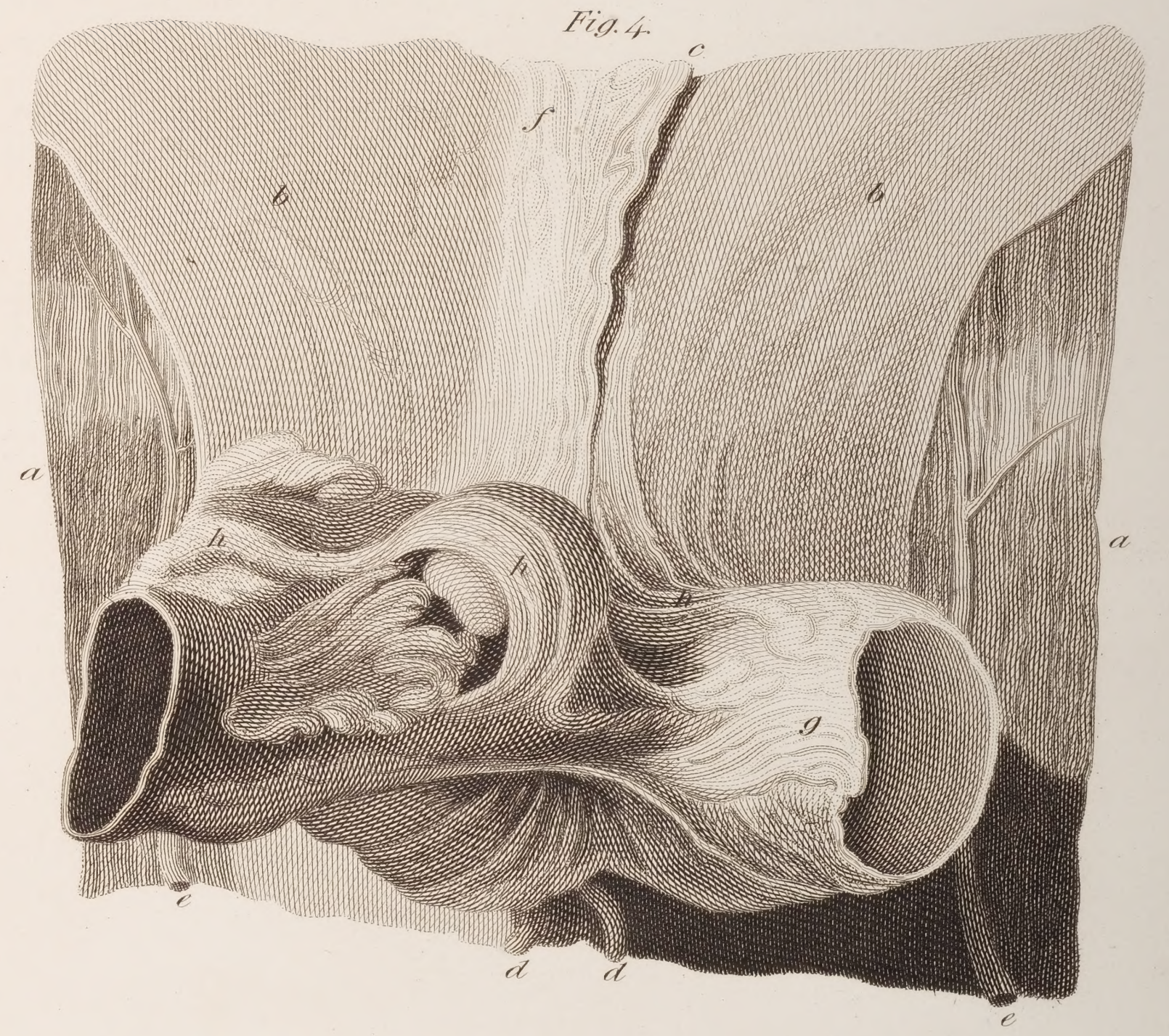


Fig. 5.

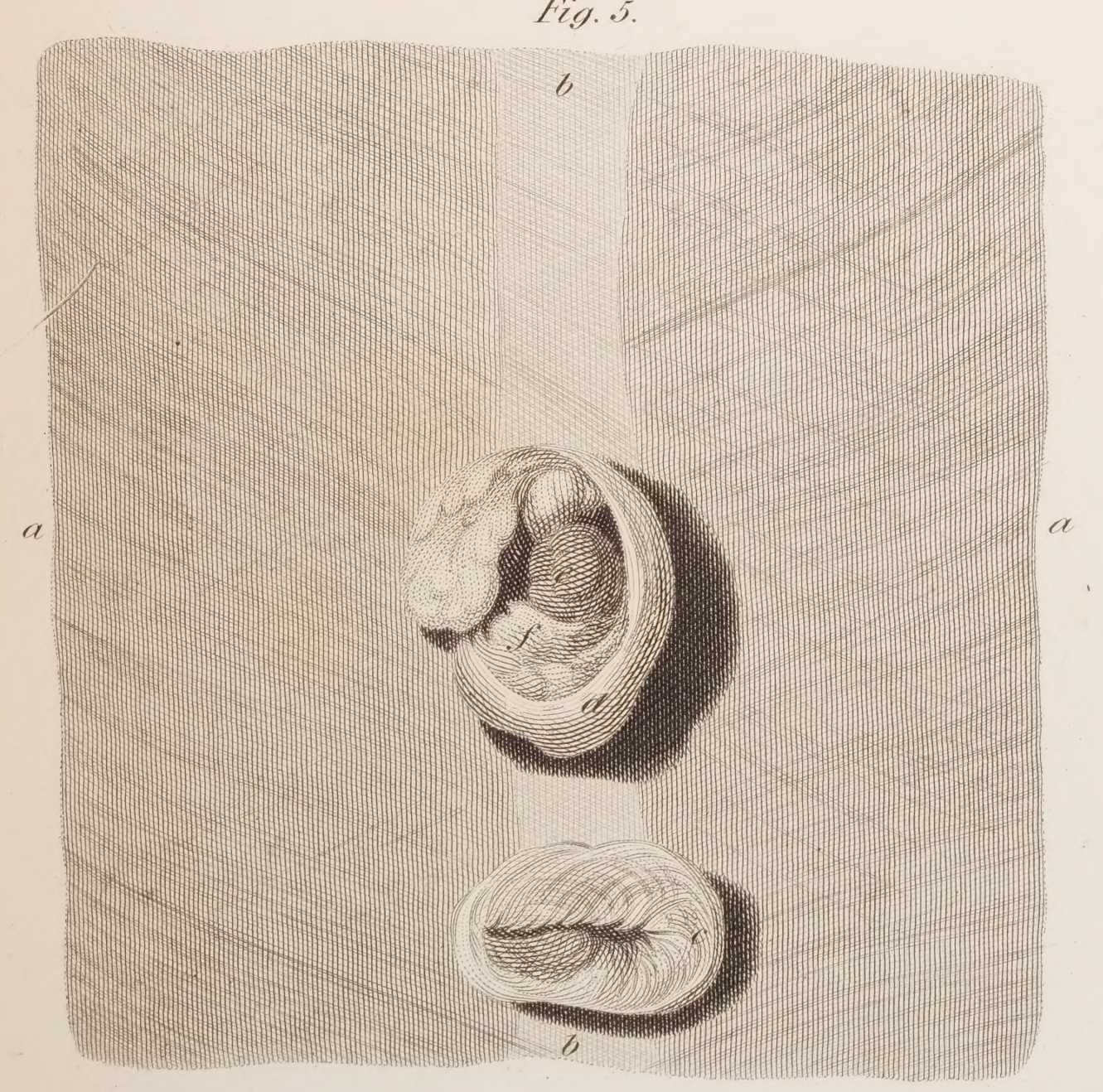


Fig 3



Fig. 2.

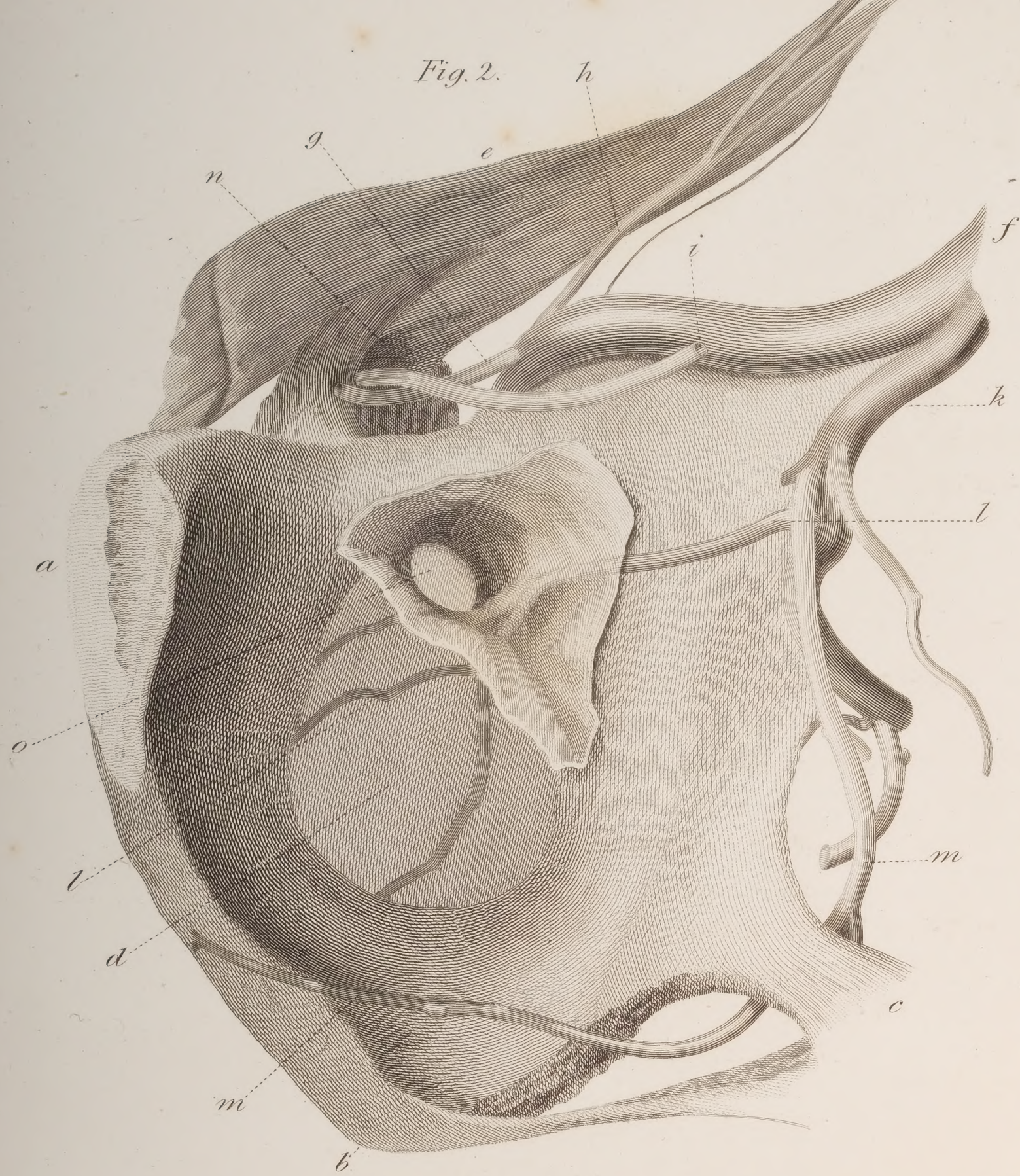


Fig. 1.

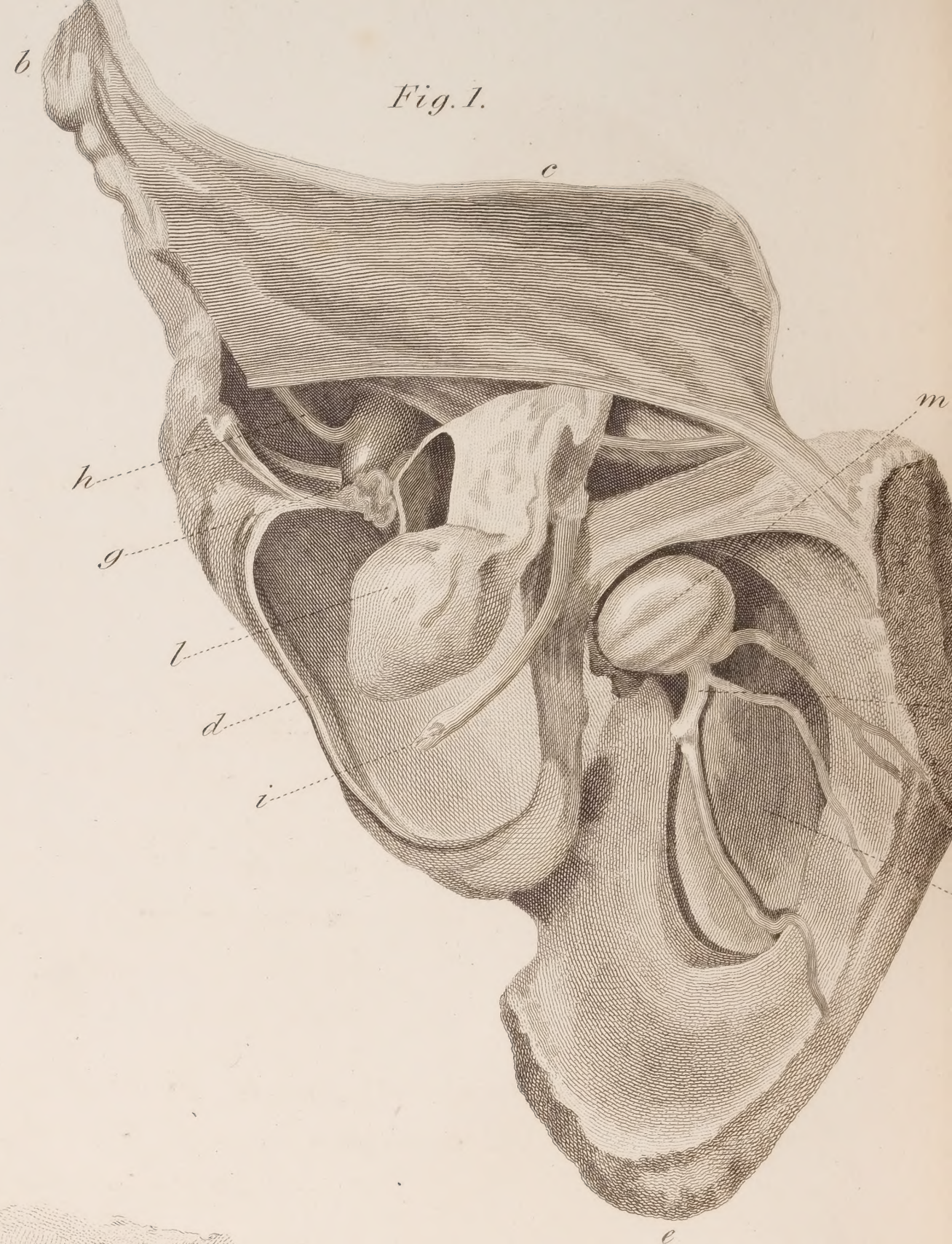


Fig. 4.

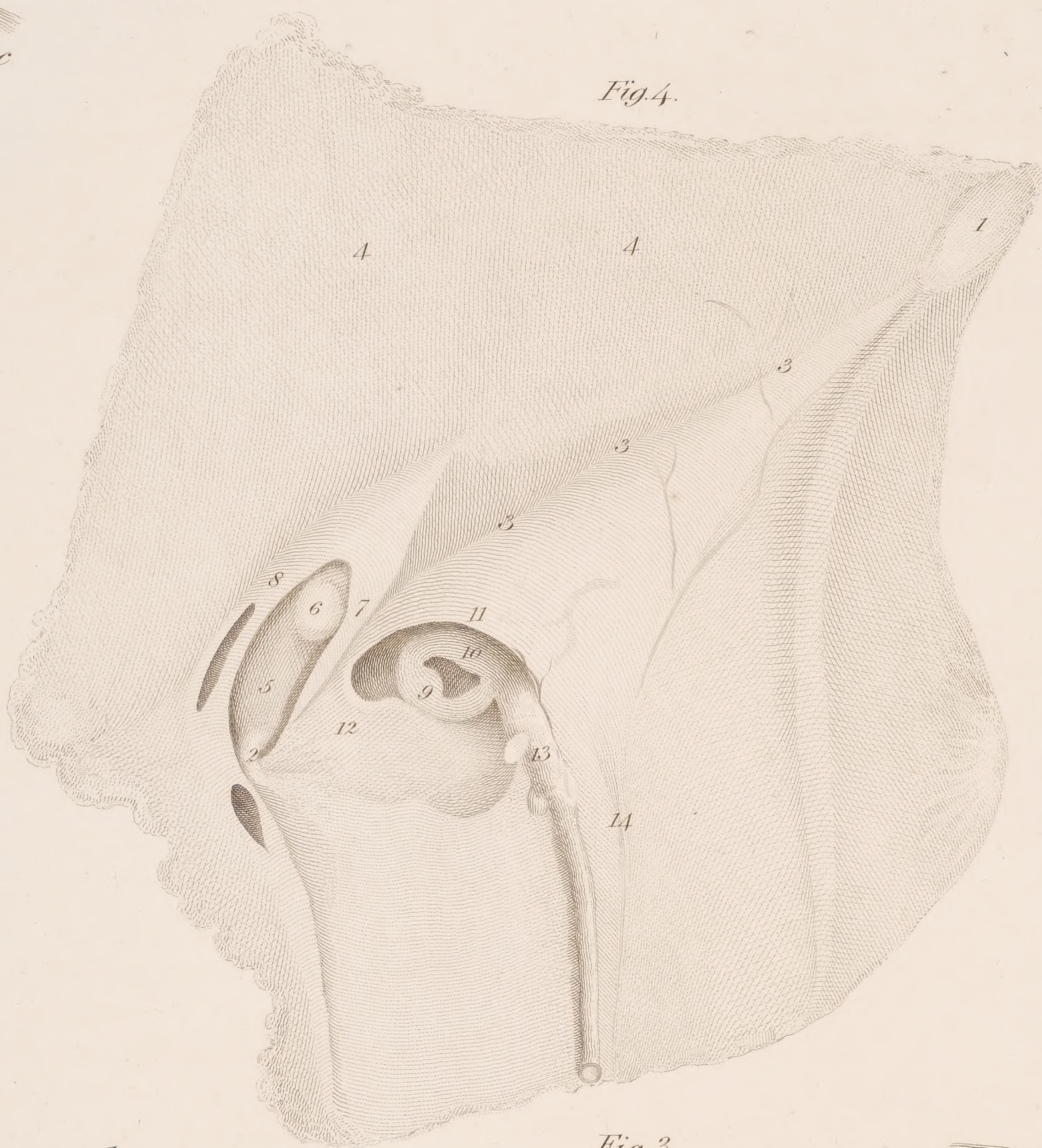


Fig. 3.

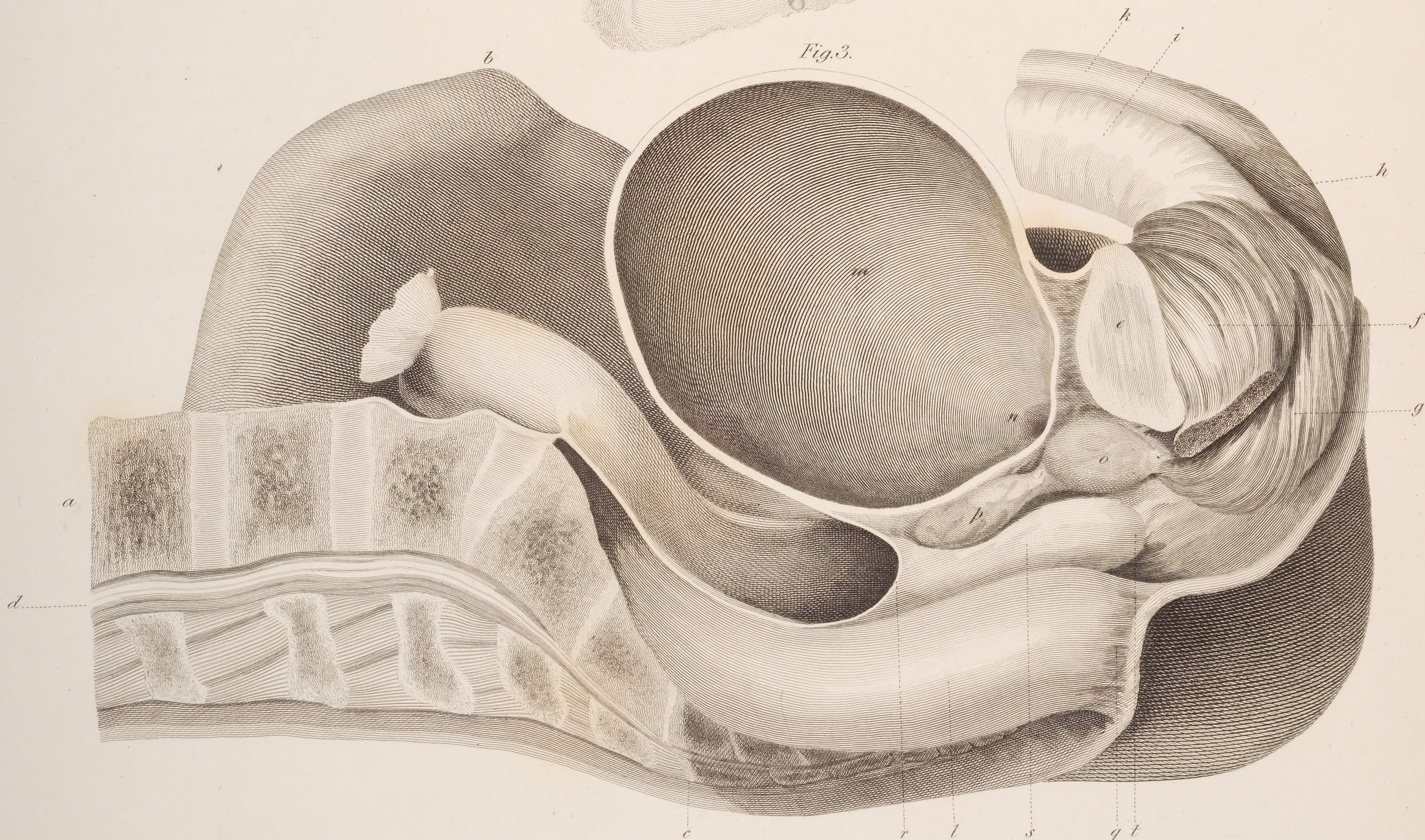


PLATE XI

CONTAINS two views of a thyroideal hernia (or hernia foraminis ovalis). A view of a perineal hernia in the possession of Mr. Cutcliffe, of Barnstaple. Also a hernia congenita in the female, and a crural hernia sent me by Mr. Allan Burns, surgeon, of Glasgow.

FIG. 1. Thyroideal hernia.

- a. Symphysis pubis.
- b. Spine of the ilium.
- c. Abdominal muscles.
- d. Acetabulum.
- e. Tuberosity of the ischium.
- f. Ligament of the obturator, or thyroid foramen.
- g. Crural artery.
- h. Artera circumflexa ilii.
- i. Spermatic vein.
- k. Obturator artery.
- l. Inguinal hernia drawn aside.
- m. Thyroideal hernia situated just behind the pubes.

FIG. 2. Posterior view of the same preparation.

- a. Symphysis pubis.
- b. Tuberosity of the ischium.
- c. Sacro sciatic ligaments.
- d. Ligament of the thyroid foramen.
- e. Abdominal muscles.
- f. External iliac artery.
- g. Epigastric.
- h. Circumflexa ilii.
- i. Spermatic vein.
- k. Internal iliac artery.
- ll. Obturator, or thyroideal artery.
- mm. Internal pudendal artery.
- n. Mouth of the inguinal hernia.
- o. Mouth of the thyroideal hernia.

FIG. 3. Perineal hernia.

- a. The lumbar vertebræ.
- b. Spine of the ilium.
- c. Sacrum.
- d. Spinal marrow.
- e. Symphysis pubis.
- f. Erector penis.
- g. Accelerator urinæ.
- h. Bulb of the penis.
- i. Corpus cavernosum.
- k. Corpus spongiosum.
- l. The rectum.
- m. The bladder cut open, which it is not in the preparation.
- n. The urethra.

- o. Prostate gland.
- p. Vesicula seminalis.
- q. Anus.
- r. Mouth of the hernia.
- s. Body of the sac.
- t. Its fundus terminating nearly opposite the anus.

FIG. 4. From Mr. Allan Burns.

1. The spine of the ilium.
2. The tubercle of the pubes.
3. The crural arch.
4. The abdominal muscles.
5. The inferior, or external orifice of the inguinal canal.
The canal itself in this subject is very large and short, and contains
6. An incipient hernia congenita. The pillars of the canal are here seen to separate from each other fully an inch above the tubercle of the pubis, by which the herniary tumour appears much nearer to the spine of the ilium than it ought to do, and on the opposite side, where it protruded further, it took the direction more of the crural than of inguinal hernia.
7. The lower pillar of the canal inserted into the tubercle of the pubes.
8. The upper pillar, in part, inserted into the tubercle, but a production arising from it, which encircles the head of the gracilis and triceps muscles, reaching to the posterior part of the thigh, where it is lost. The healthy and morbid action of this fillet has been already explained.
9. Gimbernat's duplicature protruded so as to form an envelope of the herniary sac, which has been removed to shew the parts more distinctly.*
10. The opening which had been originally placed in the centre of the septum, stretched across the crural foramen.
11. The falciform process of the groin receiving a part of the protruded duplicature, and concealing from view the femoral vein.
12. The psoas aponeurosis covering the pectineus muscle, and rising up between the vena saphæna and deep-seated vein to join the falciform process.
13. The vena saphæna.
14. The (seat of the) femoral artery.

* I have called this the fascia propria of the hernial sac.

PLATE XII.

GIVES an internal view of the ischiatic hernia, from Dr. Jones's patient. The preparation is in the anatomical collection at Saint Thomas's Hospital.

- a.* Section of the pubes.
- b.* Spinous process of the ilium.
- c.* Sacrum.
- d.* Iliacus internus muscle.
- e.* Psoas muscle.
- f.* Piriformis muscle.
- g.* Coccygeus muscle.
- h.* Termination of the external iliac artery in the crural.
- i.* Beginning of the crural vein.
- k.* Trunk of the common iliac artery.
- l.* Internal iliac artery.

- m.* Obturator artery, which may be traced before the sac as far as the obturator foramen.
- n.* Internal iliac vein.
- o.* Obturator vein passing behind the hernia to the obturator foramen, from which another vein (*p*) is seen passing into the iliac vein.
- q.* Hernial sac.
- r.* Its orifice.

The artery was injected with red wax, the vein with yellow, which is the reason the artery is so much darker than the vein in the plate.

PLATE XII.





PLATE XIII.

A posterior view of the ischiatic hernia.

- a.* Anterior superior spinous process of the ilium.
- b.* Crista of the ilium.
- c.* Sacrum.
- d.* Os coccygis.
- e.* One of the sacro sciatic ligaments.

- f.* Acetabulum.
- gg.* Sciatic nerve.
- h.* Gluteal artery.
- i.* Ischiatic hernial sac situated between the artery and nerve.

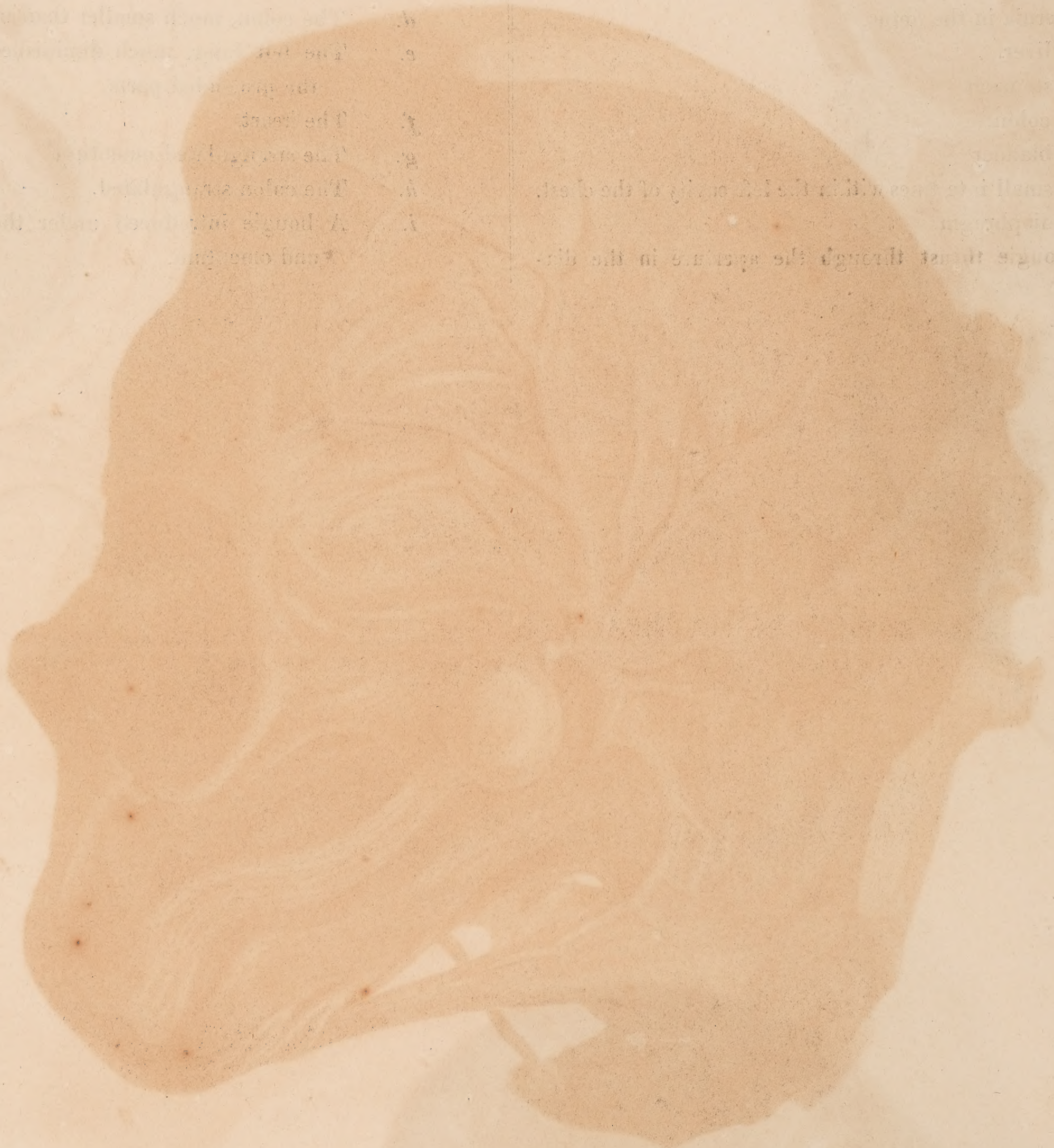


PLATE XIV.

CONTAINS different views of the phrenic hernia.

FIG. 1. Phrenic hernia, produced by fracture of the ribs.

- aa.* Dorsal vertebræ.
- bbb.* The ribs.
- ccc.* The fractures of the ribs.
- d.* The diaphragm.
- e.* The intestine within the abdomen.
- ff.* The intestine strangulated through a laceration of the diaphragm.

FIG. 2. Phrenic hernia in the fœtus.

- aa.* The liver.
- b.* The stomach.
- ccc.* The colon.
- d.* The bladder.
- eee.* The small intestines within the left cavity of the chest.
- ff.* The diaphragm.
- gg.* A bougie thrust through the aperture in the dia-

phragm, by which the intestines had passed into the chest.

- h.* The heart.
- i.* The right lung.

FIG. 3. Phrenic hernia in the adult strangulated. This plate is of a reduced size from the adult.

- a.* The diaphragm.
- b.* The omentum in the cavity of the abdomen.
- c.* The small intestines.
- d.* The colon, much smaller than usual.
- e.* The left lung, much diminished by the pressure of the protruded parts.
- f.* The heart.
- g.* The strangulated omentum.
- h.* The colon strangulated.
- i.* A bougie introduced under the strangulated colon and omentum.

Fig. 2.



Fig. 3.



Fig. 1.

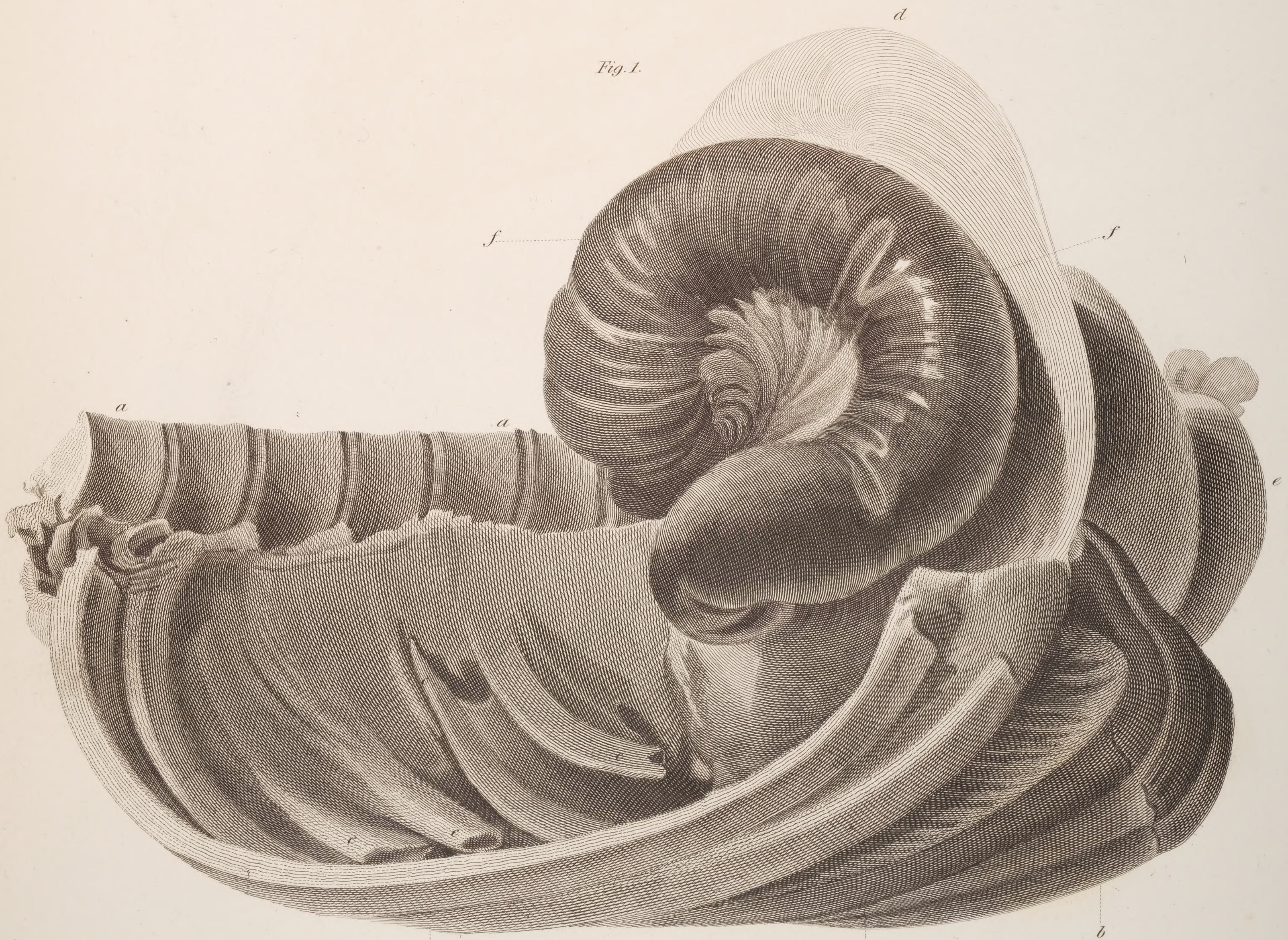




PLATE XV.

VIEW of the mesenteric hernia taken from the body of a person opened by Mr. Richard Pugh, and preserved in the collection at Saint Thomas's Hospital. The drawing was made by Mr. Kavanagh, one of our students, from the recent subject.

- | | | | |
|-------------|---|------------|---|
| <i>aaa.</i> | The sternum and ribs. | <i>f.</i> | The sac formed by the separation of the laminæ of the mesentery cut open. |
| <i>bbb.</i> | The abdominal muscles turned back. | <i>gg.</i> | The small intestines within the bag. |
| <i>ccc.</i> | The great arch of the colon. | <i>h.</i> | The duodenum passing into the mesenteric sac. |
| <i>d.</i> | The omentum. | <i>i.</i> | The ileon passing from the sac to the cæcum. |
| <i>e.</i> | The upper <i>e</i> placed on the mesocolon. | <i>kk.</i> | The thighs. |
| <i>e.</i> | The lower <i>e</i> placed on the bag formed by the mesentery. | | |

PLATE XVI.

View of a mesocolic hernia. Taken from a preparation in the collection at Saint Thomas's Hospital.

- aa.* Posterior view of the colon from the left side.
- b.* Sigmoid flexure of the colon.
- cc.* Arteria colica.

- d.* The sac formed by the separation of the laminæ of the mesocolon.
- ee.* Small intestines passing into the sac.
- ff.* The aperture by which the intestines entered the sac.



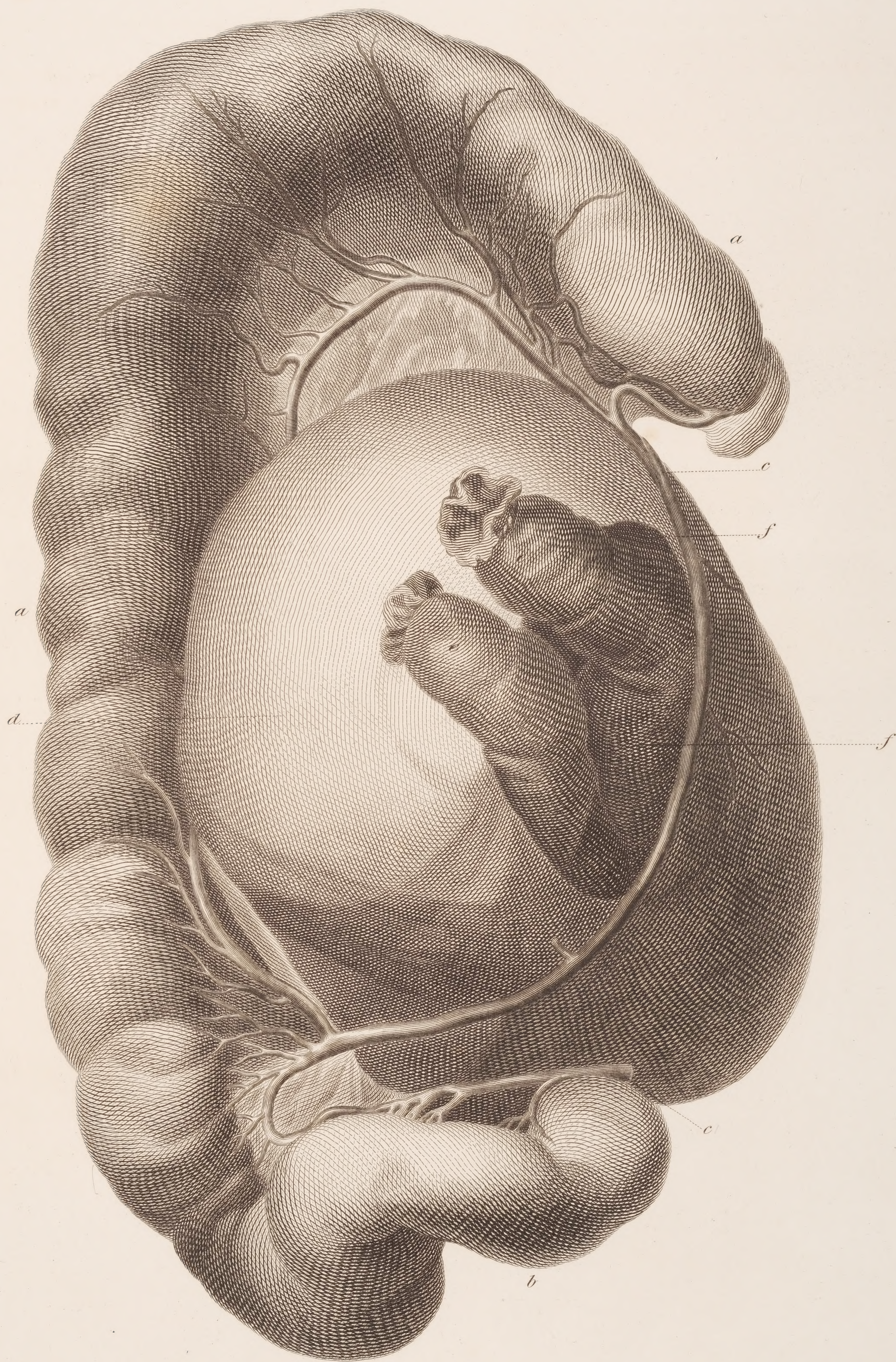




Fig. 3.



Fig. 1.



Fig. 4.



Fig. 5.



PLATE XVII.

THIS Plate shews a number of sacs found in an intestine, which was taken from the body of a person labouring under hernia, given me by Mr. Headington, Lecturer on Anatomy and Surgery, and Surgeon to the London Hospital. Also a view of an intestine strangulated through the mesentery, which was a present from Mr. Palmer, of Hereford, and two portions of intestine strangulated by a membranous band, which I took from a patient of Mr. Weston's, of Shoreditch. The two other subjects are views of the intestines of a dog, into which I made a longitudinal incision; the ligatures were cut off close to the intestine, and the intestine was returned into the cavity of the abdomen. See Mr. Thompson's Experiments, Part I.

FIG. 1. Intestine protruded through the mesentery.

- a.* Portion of intestine.
- b.* The other portion.
- c.* The strangulated intestine.
- d d.* The hole in the mesentery, through which the intestine had passed, and by which it was strangulated.

FIG. 2. Intestines strangulated by a membranous band.

- a a.* Abdominal muscles (lined by the peritoneum) taken from the lower part of the abdomen.
- b.* Hernia on the left side.
- e.* Membranous band passing from the sac to the intestine.
- f.* Membranous band returning to the sac from the intestine.
- g.* The band passing around a part of the intestine.
- h h.* The intestine strangulated by the band *g*.
- i i.* Intestine strangulated in a less degree, by the portions of the membranous band *e*, and *f*.
- k k.* The mesentery of each portion of the intestine.

FIG. 3. The same membranous band shewn without the intestine.

- e f.* The band going from and towards the sac, including the intestine *i i*.
- g.* The part which surrounded the intestine *h h*.

FIG. 4. Sacs on the intestine.

- aaaa.* Intestine only in part engraved.
- b b b.* The mesentery.
- c c c c.* Sacs communicating with the inner side of the intestine.

FIG. 5. *a a.* Intestine of a dog, into which an incision had been made.

- b.* Its mesentery.
- c.* The omentum.
- d.* The omentum adhering at the part at which the incision had been made, and closing the aperture externally.

FIG. 6. Internal view of the same intestine.

- a a.* Intestine.
- b.* Ligature appearing within the intestine.
- d.* The knot within the intestine.
- e.* Omentum and intestine adhering.

